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SOME NEW DISEASES IN PAEDIATRICS*

BY

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In the twenty-odd years since I qualified in medicine the practice of paediatrics has undergone profound change. Some of the diseases which were commonplace in my resident days have become rarities; others, while still of frequent occurrence, have all but lost their power to kill. Infantile rickets due to vitamin-D deficiency has disappeared from the city where Leonard Findlay and Noel Paton found so much clinical material. We no longer have the dreadful epidemics of gastro-enteritis which used to carry off hundreds of infants each autumn. Pneumonia is still common enough but is now rarely fatal, save in the neonatal period. Marasmus, of course, is not a disease but a clinical state of wasting or atrophy. We used to see many marasmic infants, and the most common causes of their feeble and miserable state were underfeeding and infection. To-day, infant feeding is not often a problem, and most infections can be cured before they have led to serious tissue-wasting.

The "new" diseases which I wish to discuss have been thrown into focus largely as a result of these changes in the paediatric picture. For example, marasmus is now more often due to diseases such as pancreatic fibrosis, hyperchloraemic acidosis, and idiopathic hypercalcaemia than to incorrect feeding or infection. When we see a case of rickets to-day it is more probably due to renal glomerular or tubular deficiency than to vitamin deficiency. The rapid response of pneumonia to antibiotics is now so much the rule that we have learned to suspect the existence of a fibrocystic pancreas when such response fails to take place.

Other influences at work in helping to define these new clinical entities, and running concurrently with the changing incidence of disease, have been the technical advances of the biochemist, the pathologist, and the radiologist.

Fibrocystic Disease of the Pancreas ("Mucosis")

This disease has an incidence of at least 1 in 1,500 new births (Bodian *et al.*, 1952). It is inherited as an autosomal recessive characteristic, and the gene is carried by about 1 in 50 of the population. An affected infant is the result of the mating of two carriers. The chances of any child of such parents being affected by the disease is 1 in 4. Although Dorothy Andersen has considered it to be a primary pancreatic disorder (Andersen, 1938; Andersen and Hodges, 1946), many paediatricians now incline towards the view that there is a generalized disorder of the mucous glands throughout the body (Farber, 1944), hence the names "mucoviscidosis" and "mucosis." This might be due to the absence of an enzyme concerned in mucus production or to the absence of a mucinase so that the mucus is scanty and excessively viscid (Norman, 1954).

Pathology.—The pancreas is consistently abnormal. It may show cystic dilatations of acini and ducts which contain eosinophilic material having a homogeneous, granular, or laminated appearance, but cystic change is not a constant feature, and in many cases fibrosis and atrophy of the exocrine parenchyma are the essential changes. The islet cells are not involved. Another typical and often widespread change is distension with mucus of the salivary glands and the mucous glands of the bronchi, oesophagus, duodenum, and gall-bladder. An inborn dyscrasia of the sweat glands may explain the recent observation that in this disease there is an excessive loss of sodium, chloride, and potassium from the skin (Darling *et al.*, 1953). Respiratory infection by the *Staphylococcus aureus* is so frequent as to be part of the disease. It produces widespread bronchiolitis with obstructive emphysema and patchy atelectasis. The bronchioles are plugged with viscid mucopus. It may go on to bronchiectasis or multiple abscesses—less commonly to alveolar consolidation, empyema, and spontaneous pneumothorax. A rather characteristic finding is squamous metaplasia of the bronchial epithelium, which is probably due to a combination of chronic sepsis and vitamin-A deficiency.

Clinical Picture.—As we might expect from these widespread tissue changes, the clinical patterns of the disease may vary widely. They can conveniently be described, as they tend to appear at four different age periods, although there is, of course, considerable overlapping.

Meconium Ileus.—The disease may appear within a few hours or days of birth as an acute intestinal obstruction with bilious vomiting, gross abdominal distension, and absolute constipation. Rectal examination reveals only a little inspissated mucus. *X*-ray examination of the abdomen shows gaseous distension and fluid levels, and a typical but not constant sign is the appearance of minute gas bubbles in the inspissated meconium which is causing the obstruction. Meconium ileus must be distinguished from other causes of neonatal obstruction, particularly Hirschsprung's disease; in the former, a small barium enema will show a congenital microcolon, whereas in the latter the large-bowel appearances at birth will not be greatly abnormal (Ehrenpreis, 1955). Occasionally meconium ileus is associated with antenatal perforation of the small bowel, which results in *meconium peritonitis*. The infant presents at birth with a grossly distended abdomen, a fluid thrill can be elicited, and *x*-ray examination shows a fine widespread peritoneal calcification. Although the perforation has usually sealed itself before birth, it may fail to do so, in which case

*Abridged from a postgraduate lecture delivered before the Royal Faculty of Physicians and Surgeons of Glasgow on March 18, 1955.

bacterial peritonitis develops within a few hours of birth. In these circumstances *x*-ray examination shows free fluid and air within the peritoneal cavity.

Intractable Respiratory Infection.—Very often the first signs of disease appear in the early weeks or months after birth in the form of an acute respiratory illness. The outstanding features are severe dyspnoea and expiratory wheezing. There may be little fever. The chest is often "blown up" with obstructive emphysema, and commonly there is marked subcostal and suprasternal retraction due to bronchiolar obstruction. The clinical signs over the lungs, especially sticky rales and rhonchi, are often much more striking than the *x*-ray appearances, which may show only hypertranslucency due to emphysema. In fact, one or other lung may herniate into the mediastinum. At a later stage the *x*-ray films show a rather typical streaky appearance radiating outwards from the lung roots and due to interstitial infection and fibrosis. This may be followed by multiple "soft" opacities representing small abscesses or bronchiectasis. In a few cases the onset takes the form of an acute pneumonic consolidation which may be complicated by empyema. As in other staphylococcal infections of the lung, a spontaneous pneumothorax may produce a sudden emergency. A pointer to the true diagnosis may be found in the infant's stools, which are often, but not always, greasy and possessed of a strikingly foul odour. In its absence the diagnosis may yet be suspected when it is found that antibiotics in adequate doses afford the infant but little relief from his acute distress.

Marasmus and Steatorrhoea.—Although steatorrhoea is present from birth, the excellent, and at times ravenous, appetite of these infants in the absence of severe respiratory infection may prevent serious wasting during the period of pure milk-feeding. After the age of 4 months or thereabouts, the introduction of cereals to the diet results in the stools becoming frothy, foul-smelling, and often loose. The typical combination of failure to thrive, excellent appetite, and excessively foul stools in the first year of life should always suggest the diagnosis of pancreatic fibrosis.

The Coeliac Syndrome.—With milder degrees of the disease the child may not reach the physician until the toddler age, when he appears wasted and underdeveloped, with a distended abdomen, and passes frothy or greasy semi-formed foul-smelling stools. The unwary may make a diagnosis of idiopathic coeliac disease, but the differential diagnosis can be made on clinical grounds alone. In pancreatic fibrosis a careful history will reveal that symptoms first appeared in the early weeks of life, whereas coeliac disease rarely presents before the age of 9 months. The excellent, often voracious, appetite in pancreatic fibrosis is in marked contrast to the unhappy anorexia of the coeliac child. Chronic respiratory infection with a spasmodic harsh unproductive cough is rarely absent in pancreatic fibrosis; it is not a feature of coeliac disease. Severe hypochromic anaemia is common in coeliac disease, rarely seen in pancreatic fibrosis. Finally, as pancreatic fibrosis is a familial disease there is often a history to suggest that previous infants have been similarly affected—for example, of death in the neonatal period or of death from pneumonia in the early months. It is rare to see more than one child with coeliac disease in a family. Faecal fat analysis will not serve to distinguish the two diseases, as in pancreatic fibrosis the excess fat in the stools may be normally split despite the lack of pancreatic secretion.

Diagnosis.—The final proof of the diagnosis rests upon the finding that trypsin is absent, or present only in very low titres (under 1 in 50), in the duodenal juice obtained by aspiration (Andersen and Early, 1942). The aspiration of scanty and viscid duodenal juice is sometimes difficult in this disease, but, in my experience, it is not necessary or particularly helpful to resort to fluoroscopy during this manœuvre. The faeces may also be tested for proteolytic activity (Emery, 1952), although this may be due on occasion to bacterial enzymes and not to trypsin. However, in children under 2 years of age the finding of proteolytic activity in high titres excludes fibrocystic disease of the pancreas, and this simple technique is a useful screening test which can be used to avoid some unnecessary and time-consuming duodenal intubations. The failure of the faeces to digest gelatin at a dilution above 1 in 50 in three consecutive specimens is strong presumptive evidence of pancreatic fibrosis, but I am always hesitant to accept as firm a diagnosis which is not based on the examination of the duodenal juice. Other diagnostic tests, such as vitamin-A absorption, amino-acid absorption curves, glucose tolerance, microscopy of the faeces, and the like, are probably not worth the trouble involved for routine work.

Prognosis.—So far as I am aware no child has ever been cured of this disorder, although, in many, life has been prolonged for years and been made immeasurably happier. Perhaps the majority of these unfortunate children die in infancy of progressive lung destruction. In older children, some of whom are reaching puberty, the chronic lung fibrosis results in death from cor pulmonale.

Treatment.—The neonatal emergencies come within the province of the paediatric surgeon. He has achieved some remarkable results in patients who have reached him soon enough after birth. After this stage there must be two aims in the treatment of these children—the prevention or control of respiratory infection and the maintenance of reasonable nutrition. Neither is fully within our present capabilities. None the less, the outlook has been vastly improved by the broad-spectrum antibiotics—chlortetracycline, oxytetracycline, and chloramphenicol. Penicillin, given intramuscularly or in aerosol form, has proved of very limited value, although in some patients it may usefully be combined with streptomycin. Periodic laboratory tests of the sensitivity of the staphylococcus, cultured from pharyngeal or laryngeal swabs, enable us to use the available antibiotics, singly or in combination, to the best advantage. Strain resistance is probably less of a problem if exacerbations of respiratory infection are treated as they occur than if, as is commonly practised, permanent antibiotic prophylaxis is attempted. A high-protein intake is rational, but there is probably no advantage in strict limitation of fat. Triple-strength pancreatin in the form of enteric-coated granules seems to be of value in some patients. Infants should be given 15–45 gr. (1–3 g.) in each feed; older children may be coaxed to ingest double this amount. A water-soluble preparation of vitamins A and D should also be prescribed.

There can be no doubt that the future of these children is influenced more by the degree of respiratory infection and the extent to which it can be kept under control than by any other therapeutic measures. Good hygienic surroundings naturally improve the prognosis by diminishing the chances of exposure to infection. For the same reason, it is wise to limit the stay of these patients in hospital to the minimum, and, when they must be admitted, to isolate them in cubicles whenever possible.

Infantile Renal Acidosis (Hyperchloraemic Acidosis)

I imagine that even the least chemically minded of physicians must be intrigued when an infant goes into a state of chronic acidosis and dehydration in the absence of any excessive loss of fluid or electrolytes from diarrhoea or vomiting, in the absence of an excessive intake of acid-producing substances, and despite an adequate intake of water and salt (Butler *et al.*, 1936; Hartmann, 1939; Latner and Burnard, 1950; Hutchison and MacDonald, 1951; Doxiadis, 1952; Lightwood *et al.*, 1953). He finds a clue when he discovers that this acidotic infant habitually passes an alkaline urine.

Clinical Picture.—The age of onset is between 4 months and 1 year. An infant who has been making satisfactory progress develops anorexia, occasional vomiting, and constipation without obvious cause. The constipation is severe and the abdomen is found to contain many small hard faecal masses. Weight loss is inevitable. Irritability is often in striking contrast to previous contentment. Observation

reveals a dehydrated infant with sunken eyes, dry inelastic skin, pale greyish complexion, and a diminutive appearance which itself often suggests the diagnosis to the thoughtful clinician. Inconstant features are the sighing respirations of acidosis, excessive thirst, and recurrent bouts of unexplained fever. The urine when passed will be found to be neutral or alkaline, and in some cases there is also a low-grade urinary infection with a resultant but often rather unimpressive pyuria.

Blood Chemistry.—The constant diagnostic finding is lowering of the plasma bicarbonate level, which is indicative of a state of metabolic acidosis. The plasma chloride level is usually, but not in every patient, considerably raised. The blood urea may be above normal. Other chemical levels are not affected.

Aetiology.—It would appear that in this disease the proximal renal tubules lose the ability to reabsorb bicarbonate from the glomerular filtrate, the acidosis being brought about by the constant drain of body base from the kidneys (Hartmann, 1939; Latner and Burnard, 1950). It is not known why this defect occurs; presumably it is acquired, not congenital. A fall in the incidence of this disease has occurred in the past year or so. It has been suggested that this may be related to the withdrawal of mercury from some popular "teething powders." A similar dysfunction with identical chemical changes in the blood has been described in older people (Baines *et al.*, 1945; Albright *et al.*, 1946). In them, however, the clinical picture has taken the form of osteomalacia or nephrolithiasis, and is quite dissimilar to that seen in young infants. It seems possible that these two very different clinical entities represent the same abnormality in body function, the effects being determined by the age at which it appears.

Pathology.—In the fatal cases necropsy always reveals a fine calcinosis confined to the renal medulla. It has only rarely been radiologically demonstrable during life. The calcium is deposited in and around dilated distal tubules, and is presumed to be an effect, not the cause, of the disease. Nephrocalcinosis is not, of course, confined to hyperchloraemic acidosis, but is found in several other unrelated diseases.

Treatment.—Prompt improvement may be expected to follow the administration of alkali, either as sodium bicarbonate 15–45 gr. (1–3 g.) four-hourly, or as Shohl's solution (10% sodium citrate and 6% citric acid), 60–120 ml. in divided doses. The dose should be sufficient to raise the plasma bicarbonate to 45 vols. per 100 ml. (20 mEq per litre), and it should be regulated by frequent blood estimations until ultimate recovery takes place. The alkali should only be gradually withdrawn, when weight gain is satisfactory and the plasma bicarbonate remains within normal limits.

Idiopathic Hypercalcaemia

Lightwood (1952) described a syndrome—"idiopathic hypercalcaemia with failure to thrive"—in infants who showed no obvious evidence of any of the known causes of hypercalcaemia such as hyperparathyroidism, hypervitaminosis D, excessive ingestion of alkali and milk, prolonged immobilization, sarcoidosis, and the like.

Clinical Picture.—The age of onset is often as early as 6 weeks. The disease has not been described in a wholly breast-fed infant. The clinical findings are almost identical with those in hyperchloraemic acidosis. They have been well described recently by Lowe *et al.* (1954) and Creery and Neill (1954). There are, however, some points of dissimilarity which, although not perhaps of diagnostic value, can often be noted. The hypercalcaemic infant is usually strikingly apathetic, which contrasts with the irritability of the acidotic infant. In hypercalcaemia, muscular hypotonia may be so severe as to lead to a suspicion of amyotonia congenita, whereas dehydration is often absent unless vomiting has been severe. The complexion of the baby with a high serum calcium is pink, whereas in acidosis pallor is more typical. The urine in hypercalcaemia is acid when passed; it may contain a little excess protein, and mild infection is not infrequent.

Blood Chemistry.—The differential diagnosis from hyperchloraemic acidosis rests upon the blood chemical findings. The plasma bicarbonate and chloride levels are usually normal, but the serum calcium level is raised above 12 mg. per 100 ml. and there is azotaemia. The plasma proteins are often raised, and it can be shown by paper electrophoresis that this is mainly due to a rise in the α_2-globulin and sometimes also in the γ-globulin.

Aetiology.—It has been suggested that there may be an abnormal sensitivity to vitamin D. Certainly, many infants now receive more vitamin D than is strictly necessary for health, because most dried milks are fortified with calciferol and most bottle-fed infants receive further supplies in the form of official or proprietary preparations. There is evidence also that excessive calcium is absorbed from the gut by these infants, who have all been fed with cow's milk, which contains four times as much calcium as human milk. It is just possible that the very measures which we have used to abolish rickets from the land may have resulted in the appearance of hypercalcaemia in some susceptible infants.

Pathology.—The disease is rarely fatal, but nephrocalcinosis has been found in all such cases.

Treatment.—There is at present no treatment of proved value. The benign course towards eventual recovery over a period of some months makes assessment of therapeutic attempts difficult. A specially prepared low-calcium milk (Ferguson and McGowan, 1954) and cortisone (Anderson *et al.*, 1954) have been recommended; one is laborious to prepare, the other carries well-recognized risks.

Idiopathic Hypercalcaemia with Osteosclerosis

Fanconi *et al.* (1952) described the cases of two patients with hypercalcaemia who showed several abnormalities in addition to those which I have just described. Other workers have since reported similar cases (Creery, 1953; Dawson *et al.*, 1954; Lowe *et al.*, 1954). The main points in the clinical picture are physical and mental retardation, microcephaly, an abnormal facies and low-set ears, hypotonia, hypertension, and a loud precordial systolic murmur, and a most striking degree of osteosclerosis. The bones show sclerosis at the base of the skull, in the vertebrae, the shafts of the long bones, and the epiphyses, and the appearances somewhat resemble those seen in Albers-Schönberg disease. In addition to hypercalcaemia and a raised blood urea there is hypercholesterolaemia. It is not yet clear whether these cases, which run a progressive course to death, represent a difference in severity or in aetiology from the more common benign idiopathic hypercalcaemia.

Lignac–Fanconi Syndrome (Cystinosis)

This familial disease was described by Fanconi (1931) under the name "non-diabetic glycosuria in childhood." Since then it has come to be realized that most if not all of these cases are associated with the widespread deposition of cystine throughout the tissues. Lignac (1924) had, in fact, described cystinosis long before. Bickel *et al.* (1952), in their exhaustive account of the disease, regard the demonstration of cystine deposits as essential for diagnosis. They present evidence to indicate that this severe metabolic disorder is inherited as a simple Mendelian recessive character. They suggest an incidence of around 1 in 40,000 of the population and a gene-carrier rate of 1 in 100. The Lignac–Fanconi syndrome, which is a severe upset of metabolism, is quite a separate disease from the benign inborn error of metabolism called cystinuria in which excessive amounts of cystine are excreted in the urine, but in which cystine crystals are not deposited in tissue cells outside the kidneys.

Pathogenesis.—There is still much uncertainty about the nature of the metabolic disorder in this complicated disease. The hypothesis that there is a primary renal tubular deficiency in the reabsorption of glucose, phosphate, body bases, and amino-acids would account for the known biochemical abnormalities, but it fails to explain the cystinosis. An alternative and probably more tenable theory is that there is

a block in protein synthesis, so that the amino-acids collect in the body fluids; these are excreted in excess in the urine, and cystine, owing to its insolubility, is deposited intracellularly.

Clinical Picture.—It is only possible for me to outline briefly the wide variations in clinical signs which may be produced. They have received detailed attention from McCune *et al.* (1943) and Bickel *et al.* (1952). The first evidence of the disease may appear in infancy, usually after the first six months of life, as an acute disorder with acidosis, dehydration, thirst, and polyuria, anorexia, vomiting, constipation, pyrexial bouts, and failure to thrive. In fact, it may not be clinically distinguishable from hyperchloraemic acidosis or hypercalcaemia, although in these diseases there is no amino-aciduria or glycosuria. In older children there will be dwarfism, and often bone deformities, vitamin-D refractory rickets, or pathological fractures. A quite characteristic but not constant sign is photophobia, which is caused by deposits of cystine crystals in the cornea, iris, and conjunctiva. This form of the disease must be clearly separated from the so-called "renal rickets" of chronic glomerular insufficiency, in which amino-aciduria, glycosuria, and cystine storage do not occur.

Chemical Picture.—Bickel *et al.* (1952) point out that no single chemical change is constantly found in cases of this disease. The typical findings in the urine, which is alkaline when passed, are albuminuria, excess amino-aciduria, glycosuria, and hyperphosphaturia. Several specimens may have to be tested by sensitive methods such as paper chromatography (Dent, 1946) before these features are revealed. Up to twenty amino-acids may be excreted in excess, especially proline, leucine, valine, lysine, serine, cystine, threonine, glutamine, and alanine. The typical blood changes are lowered plasma bicarbonate due to metabolic acidosis, low plasma phosphorus, and low serum potassium levels. The blood urea may rise in the course of the disease. As renal failure supervenes there may develop hyperphosphataemia and hypocalcaemia, when the blood chemistry comes to resemble that seen in "renal rickets" due to glomerular inadequacy.

Diagnosis.—The demonstration of cystine storage should be regarded as the final proof of Lignac–Fanconi disease. This may be achieved in various ways: (1) Crystalline deposits may be seen in the eye with the slit-lamp. They may be identified as cystine by *x*-ray diffraction photography of a conjunctival biopsy specimen. (2) Thick bone-marrow smears may be examined for cystine crystals after fixation in absolute alcohol and staining with a solution of 0.5 g. basic fuchsin in 100 ml. of 50% alcohol. Cystine is dissolved out of tissues by routine fixatives and stains. (3) Microscopical examination of a lymph node.

Prognosis.—In the acute infantile form of the disease death occurs from acidosis and hypopotassaemia, often aggravated by infection. The older children die ultimately of chronic progressive renal failure.

Treatment.—Healing of the rickets can be achieved by massive doses of calciferol (50,000 to 600,000 units daily). Acidosis should be corrected by Shohl's solution. If there is a lowered serum potassium, some of the sodium citrate may be replaced by the potassium salt. Strict blood chemical control is necessary. We cannot yet talk in terms of cure, but life can be prolonged along these lines.

Conclusion

It has been possible for me to outline only a few of the new diseases which have been defined within recent years. There are quite a few others, such as galactosuria (Holzel *et al.*, 1952), neonatal diabetes mellitus (Wylie 1953), sucrosuria (Moncrieff and Wilkinson, 1954), toxoplasmosis (Hutchison, 1949), and agammaglobulinaemia (Hayles *et al.*, 1954), most of which have been less fully studied up to the present. They may serve to refute the suggestion, made at times, that there is little left for the astute investigator in the field of curative paediatrics.

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ORDER AND DISORDER IN PULMONARY FUNCTION*

BY

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PULMONARY CIRCULATION

The fact that the pulmonary circulation and its regulation is vital to efficient respiration needs no emphasis. There are various avenues of approach to this circulation. It can be considered from the purely structural angle as a system of branching vessels discharging into a capillary network which drains into a converging venous system, or it can be regarded as a limbo into which blood vanishes from the right ventricle and from which it emerges purified in the left auricle, without any great interest being taken in the vicissitudes of its journey through the lungs. Up till comparatively recently such was the conventional attitude of many who devoted themselves to cardiology, an outlook which in its restriction was matched only by that of the chest physician, whose only reminder of the pulmonary (or bronchial) circulation was the not infrequent occurrence of haemoptyses. Another approach is to conceive of the pulmonary circulation as a series of dimensions and energy levels related to one another by physical laws. This is essentially the physiological approach, and one which is in the closest harmony with current attitudes in internal medicine. I make no apology for basing my

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analysis on Poiseuille's equation, knowing that almost every other modern reviewer of this or any other functional aspect of the circulatory system has perforce done likewise.

The Poiseuille Equation

Poiseuille's law is fundamental to flow in tubes, and expressed symbolically is:

$$\Delta P = \frac{8nF}{\pi r^4}$$

where P=the pressure differential; F=flow; r=the cross-sectional radius of the tube; and n=the viscosity of the fluid.

It is important always to remember, however, that this law is precisely applicable only to a rigid, non-branching tube of uniform bore under conditions of axial or laminar flow. Therefore the only thing that is certain about its use in haemodynamics is that it does not describe exactly what is happening. Nevertheless it provides a very convenient expression of the important factors governing pulmonary flow.

I think the first thing to note about this formula is that, whereas all other factors operate in their first power, the diameter of the cross-section operates in the *fourth* power. That is to say, if that diameter were to undergo a twofold change, then the other factors, either individually or by integration among them, would have to make a sixteenfold adaptation to maintain the original pressure level.

Before considering these factors in detail there are several broad structural and functional features of the pulmonary circulation which must be emphasized. The flow through this circuit is the output of the right ventricle and the input of the left auricle and therefore the output of the left ventricle. The only qualification to this is in respect of the blood which goes to the lungs through the bronchial arteries and drains into the pulmonary capillary bed and that portion of the coronary flow which drains into those Thebesian veins terminating in the left ventricle. Of course, in cardiac defects involving shunts which by-pass the lungs in either direction this generalization is quite invalid. The balance between systemic and pulmonary flow must clearly be extremely accurate. A discrepancy of 1 ml. per beat (an error of only about 1.5%) in the same direction maintained for only a quarter of an hour would result in something like one litre increase of blood volume in one circuit at the expense of the other—a general trend which would be incompatible with life.

Another limiting circumstance is that, unlike systemic capillaries, there is no call for any considerable transudation from the pulmonary capillaries. So long as there is a thin film of water on the alveolar walls no fluid need escape. Even that film of water represents only a trifling amount, evaporating little, as the air is probably saturated by the time it reaches the alveoli as the result of the ample secretion of water from the walls of the bronchial and bronchiolar mucosa. Therefore pulmonary capillary pressure must not, for any substantial interval, exceed the osmotic pressure of the plasma proteins—that is, about 25 mm. Hg. In fact, the normal lungs have a marked capacity to absorb water, hypotonic and normal saline, and other electrolyte solutions if they be introduced in a fine spray, often called loosely an "aerosol." An anatomical feature of importance is that the pulmonary capillaries constitute a virtually unsupported network in the alveolar walls. This is quite unlike the systemic capillaries, which are surrounded by a connective-tissue network the intercellular interstices of which are filled with water, the whole providing the support of several mm. Hg of tissue tension.

It will at once become clear, when we examine the factors in the Poiseuille equation, that the greatest obstacle to its precise use is that it is virtually impossible to measure simultaneously a sufficient number of the factors in relation to the same part of the circulation to reach the sort of solution which would satisfy the physicist. For instance, the infinite variety of combinations of ΔP, r, and F which is to be found in the passage of water from Lake Erie to Lake Ontario is, I am sure, relatively no greater than the range of these variables found between pulmonary valve and left auricle.

Adaptations of the Fick Principle

It is now necessary to examine in some detail the various factors which comprise Poiseuille's equation. Although much patient work by Daly and his colleagues (1938) had amply demonstrated the value of such a physical analysis in the study of the pulmonary circulation in acute experiment in the dog, application of these principles to man was almost exclusively a matter of inference and analogy until it became possible to measure pulmonary blood flow and pressures in the pulmonary circuit in man. The key which has unlocked the door to a treasure-house of information has been the cardiac catheter, and all honour is due to Forssman (1929), who introduced through a cubital vein in his own arm a ureteric catheter and advanced it into the right auricle, then walked to the *x*-ray room to have its position verified. This fact received very little attention at the time, and its emulation and application to circulatory haemodynamics was delayed for more than 10 years, until the reports of cardiac output in man by Cournand and Ranges (1941) and McMichael and Sharpey-Schafer (1944). I well remember, on several occasions during the war, beguiling idle moments in remote places by discussing various problems of cardiac function and pulmonary blood flow. These always seemed to conclude with the refrain, "If we could only measure the pulmonary artery pressure." What a joy it was, late in 1943, to visit Professor McMichael at Hammersmith and to see a cardiac catheterization enabling withdrawal of samples of mixed venous blood and the measurement of mean pressures in the right auricle.

While to Forssman goes the credit of taking the decisive technical step, the fundamental concept was announced to the Würzburg Medical Society by Fick (1870), when he pointed out that if one could find out the amount of oxygen in the mixed venous blood entering, and, in the arterial blood, leaving, the lungs, then the difference was the amount taken up by the blood. This value, divided into the amount of oxygen absorbed by the lungs, would yield a measure of the pulmonary blood flow. Incidentally this communication was made to the same society which twenty-six years later was to hear Röntgen announce and demonstrate his first *x*-ray pictures.

It would make a fascinating study to trace all the ramifications of the Fick principle in its application by many ingenious adaptations not only to cardiac and pulmonary blood flow but to renal blood flow, hepatic blood flow, cerebral and coronary blood flow, etc. Many applications of the Fick principle had been made to measuring pulmonary blood flow prior to cardiac catheterization, notably the CO_2 method (Haldane) and the use of foreign gases of high solubility in blood, such as acetylene, nitrous oxide, and ethyl iodide, but none of these were entirely satisfactory. However, this is no place to review in detail the development of methods of measuring cardiac output. That has been done many times by those competent to do it.

The last few years have seen a steady improvement in the technique of cardiac catheterization, with a consequent

increase in the accuracy of results and widening scope of the information obtained. Like all scientific procedures, full value is obtainable only by close attention to detail in the perfection of the measuring devices, the control of extraneous variables, and the statistical analysis of results so as to define their limits of variability and their separation into those due to the inherent errors of the technical measurements and those due to the biological variations. It is only against such a background that the changes due to different levels of healthy activity and the changes caused by disease can be adequately studied.

Donald and his colleagues have done much to enable pulmonary blood flow to be measured at frequent intervals, both at rest and during exercise. This they (Wade *et al.*, 1953) have achieved by the frequent collection of small samples of mixed venous blood and expired air and by the development of the Gatman (1952) rapid spectrophotometric method of estimating blood oxygen. This latter development enables as many as 50 duplicate analyses to be made in about three hours. To make these measurements by the Haldane or the Van Slyke method would occupy a skilled operator 15 minutes for each estimation. Another important condition of success is frequent sampling of arterial blood and expired air throughout each investigation.

Advances in Pressure Recording

The whole subject of pressure recording has made great strides in the last few years. There are now available a variety of devices (or transducers as they are termed) which will convert the very small range over which a relatively rigid diaphragm moves rectilinearly in relation to pressure into an electrical current varying in the same simple relationship. Furthermore, these devices can be made of such a small size and such materials as to have so high a frequency response that they react without distortion to all the wave motions accessible to the cardiac catheter. Amplifying and recording devices have made similar advances, enabling direct writing recorders to draw curves of pressure waves in the heart and great vessels. In fact, the present level of technical achievement in measuring the pressure-volume characteristics of the heart and pulmonary circulation, and the attendant laboratory organization, illustrates well the application to clinical science of principles of industrial efficiency. It is not enough to be able to make certain measurements. Simultaneous measurements of several variables must be made in sufficiently large number to gain insight into the sort of changes that occur in the pulmonary circuit. This is particularly true when it is realized that clinical physiology and clinical medicine in general are gaining emancipation from the stultifying effect of the "basal state" concept. The principle of "testing under load" has invaded almost every field, in particular the cardio-respiratory; this, naturally, has posed many technical problems. As we shall see, the measurement of pulmonary haemodynamics during exercise is a highly illuminating procedure.

Knowledge of the pressures in the pulmonary artery of normal people is not as yet based on any large series. Cournand (1950) and Dexter *et al.* (1950), in a very limited number of normals, have found them of the order of 22 systolic, 8 diastolic, and 14 mean in mm. Hg above a zero level of 10 cm. above the dorsal plane in the horizontal patient.

In considering such data care must be taken to note the zero level. The sternal angle, a plane 5 cm. dorsal to the sternal angle and 10 cm. above the dorsal plane are all used by different observers and even by the same observers at different times. Fortunately, the practice is growing of giving not only the zero references but the antero-posterior diameter of the chest, so that accurate conversions can readily be affected. The Tower of Babel has many subsidiary departments dealing with such variables as this, as well as screw pitches, electrical voltages and frequencies, electric plug dimensions, units of measurement, etc.

Recent Exercise Tests

A recent study by Donald *et al.* (1955) of 16 adult volunteers revealed a mean pulmonary artery pressure of 16.5 mm. Hg at rest. Their 16 subjects were exercised on a horizontal bicycle ergometer in groups of four, each doing work resulting, during the last three of five minutes' exercise, in an oxygen uptake of 295, 397, 564, and 1,047 ml./min./square m. of body surface respectively. They found that the mean P_{PA} rose slightly from 3 to 9 mm. Hg in those performing the first three grades of work, while those doing the heaviest work had rises in pressure of from 5 to 33 mm. Hg; the greatest figure was seen in the oldest subject (49), in whom no abnormality could be elicited. This isolated observation, however, does indicate how desirable it would be to know the pulmonary artery pressure reaction to exercise in relation to age, especially in the light of the already known diminution of the maximum diffusion capacity in later life. At the same time it must be noted that another subject aged 28 performed the same work with a cardiac output of only 1 litre/min./square m. less than the older man (11 and 10 respectively), and yet his pulmonary artery mean pressure rose from only 19 to 24 mm. Hg. Much exploration in this field is obviously desirable. One of the most remarkable features of the pulmonary circulation is this facility with which flow can be increased without pronounced elevation of pressure.

In Group I (O_2 uptake at 295 ml./min./square m.) the A.–V. O_2 difference had increased from the resting level of 3.10 to 5.69 vols.%, and the cardiac output from 4.32 to 5.26 litres/min./square m. At the next grade of work (Group II with O_2 uptake at 397 ml./min./square m.) the A.–V. difference rose from 3.45 to 6.62 vols.%, and the cardiac output from 4.2 to 6.0 litres/min./square m. At the exercise level involving an O_2 uptake of 564 ml./min. the mean A.–V. O_2 difference more than doubled (from 3.23 to 8.41 vols.%) and the cardiac output rose from 4.64 to 6.70 litres/min./square m. At the arduous exercise of Group IV, entailing an oxygen uptake of 1,047 ml./min./square m. (a sixfold to eightfold increase), the A.–V. difference increased fourfold, from 3.07 to 11.32 vols.%. The cardiac output at this level was approximately doubled from 4.51 to 9.19 litres/min./square m. It will be seen that the main weight of the adaptation at these four levels of activity was taken by increasing the coefficient of oxygen utilization, thereby enabling the magnitude of increase in cardiac output to be restricted to about a twofold increase.

Donald *et al.* (1955) further analysed the relative contributions of increased pulse rate and increased stroke volume to the alteration in cardiac output. They found a wide range of adaptation, but in general the main adjustment was in rate. One could hardly find better illustrations than those just cited of the famous dictum of Joseph Barcroft, "Every adaptation is an integration."

In a patient with severe mitral stenosis the increased oxygen uptake of exercise cannot be met by a great increase in pulmonary blood flow, but has to be secured by a disproportionately great increase in A.–V. difference. In some patients mixed venous blood oxygen content has been found to fall as low as 2 vols.%. This means that the oxygen tension in the capillaries is of the same order as that in a climber on the North Col of Mount Everest. Small wonder that gross clinical features of anoxaemia dominate severe congestive cardiac failure. This illustrates the distorting effect of disease on the integrations of an adaptation.

Cournand *et al.* (1950) studied patients after pneumonectomy to try to determine the point at which further augmentation of blood flow was associated with substantial elevation of pulmonary artery pressure. They found that increases in flow above 5 litres/min./square m. through one lung resulted in increasing pulmonary hypertension. If this value is applied to a normal person it means that the pulmonary pressure might be expected to rise when the cardiac index exceeds about 10 litres/min. This value

accords well with the data of Dexter *et al.* and Donald *et al.*, except that they found that the elevation was already considerable at that level. It seems quite likely that in Cournand's one-lung patients a certain amount of adjustment in the form of a permanent vasodilatation had already taken place in the single lung. In that respect their observation is not altogether comparable with the acute exercise state in a person with two lungs. The numerous studies that have been made in patients with left-to-right shunts through septal defect and patent ductus arteriosus indicate that adaptation without hypertension to elevations of pulmonary blood flow of at least fourfold can occur.

It must be emphasized that in the Poiseuille equation the factor $\triangle P$ is a gradient to determine which it is necessary to know the pressure at both ends of the tube in question. Whereas the pulmonary artery pressure can be readily measured, the downstream recording is not so easy. Hellems *et al.* (1949) found that if a cardiac catheter is pushed as far as it will go into the peripheral lung field it is possible to withdraw blood that is almost 100% saturated with oxygen, and a pressure can be recorded which is identical with that obtained by inserting the catheter through a defective atrial septum in a retrograde direction into a pulmonary vein. Epps and Adler (1953) and Allison and Linden (1953) have measured left auricular pressure directly in cases of mitral stenosis by inserting through the bronchial wall into the left auricle, via a bronchoscope, a needle attached to a bronchoscopic suction tube. A cardiac catheter was at the same time wedged in the peripheral lung field. It was possible, by using a three-way tap, to transfer the pressures in these two sites in quick succession to a transducer-recorder system. In every instance the mean pressures in the left atrium and blocked peripheral pulmonary artery were found to be equal, and these workers regarded this as confirming the view that the pulmonary capillary venous pressure measured by cardiac catheterization is an accurate measure of the left atrial pressure in mitral valve disease.

Björk (1954) has obtained similar confirmatory evidence by tapping left atrial pressure directly through a long needle inserted through the skin of the back into the left auricle in mitral stenosis. So far as I know, however, this critical direct demonstration of the validity of the transpulmonary "wedge" or P.C. pressure as an indicator of left atrial pressure has been made only in cases of mitral stenosis.

BRONCHIAL CIRCULATION

We now come to a consideration of the contribution of the bronchial circulation to haemodynamic adjustments in the pulmonary circulation. Until about twenty years ago this circulation was thought to have no other role than that of providing oxygen for the lung as a living tissue.

It has become clear, however, that the bronchial circulation reacts vigorously to a number of disease processes in the lung. Some doubt exists about the presence of broncho-pulmonary anastomoses in normal lungs. Lilienthal and Riley (1954), in an admirable review, concluded that the weight of evidence pointed to the existence of precapillary anastomoses between the two circulations. Miller (1947) had come to the conclusion that in dogs no such anastomoses could be found, and he thought that vasa vasorum to the pulmonary vessels were being mistaken for true anastomoses; but other workers, notably Marchand *et al.* (1950), by a variety of injection and histological techniques on anatomical specimens, were satisfied that such anastomoses existed. Marchand *et al.* also studied the vascular pattern in lung abscess and bronchiectasis, and found evidence of extensive and large broncho-pulmonary junctions. They pointed out that these appeared to be due to the opening of latent anastomoses, as they occurred at some distance from the site of the lesion, and bore no evidence of originating in vascular granulation tissue. Furthermore, they found them in emphysema in the absence of inflammation and necrosis. They further concluded that the calibre of these channels indicate a large volume of flow from bronchial to pulmonary arteries.

Broncho-Pulmonary Anastomoses

It is well established that in pulmonary stenosis, and particularly in pulmonary atresia, the predominant or sole source of access (in the absence of a patent ductus arteriosus) of blood to the pulmonary capillary bed is via broncho-pulmonary shunts. East and Barnard (1938) described four patients with Fallot's tetralogy who had complete and presumably lifelong atresia of the pulmonary artery and yet had survived for 33, 30, 20, and 6 years. Gross dilatation of the bronchial arteries was noted in two of these cases. Liebow *et al.* (1949) and Cockett and Vass (1951) have also shown in bronchiectasis that the bronchial vascular system is grossly enlarged and that numerous broncho-pulmonary channels are present in and around the diseased portions of the lungs. A number of studies of the vascular patterns of chronic pulmonary tuberculous lesions has shown that the blood supply of such areas comes to be almost exclusively bronchial, while the pulmonary vessels are frequently obliterated.

In primary lung tumours, bronchial arteries have been found to provide a rich blood supply (Wood and Miller, 1938). Primary bronchial carcinomata, but, curiously enough, no secondary lung carcinomata, were found by Cudkowicz and Armstrong (1953) to be associated with prominent broncho-pulmonary anastomoses. Gilroy *et al.* (1951) found that the blood obtained at operation from pulmonary arteries leading to lobes rendered atelectatic by bronchial obstruction was almost completely oxygenated. Injection studies of the excised areas showed that this was due to the presence of wide communications with the bronchial system. I have seen at operation the large high-pressure vessels containing arterialized blood that surround chronic bronchiectatic lobes, and have often been assured by thoracic surgeons that these are usually found in such cases.

Turn now to the more experimental approach to this problem. Daly and his colleagues have long insisted, on the basis of their studies on heart–lung preparations, that the bronchial circulation is capable of exerting profound influence on pressure–flow relationships in the pulmonary circuit. Bloomer *et al.* (1949) ligated the pulmonary artery in dogs and found that oxygenated blood reached the pulmonary artery distal to the ligature in large amounts from bronchial artery communications. Their studies had a sound functional basis, and showed that in the course of a few weeks the blood flow in the lung when the pulmonary artery was ligated rose from a value of 30 ml./min. to values of around 1 litre/min., and even, in one instance, as high as 2 litres/min. They calculated that in such a case the output of the left ventricle could be as much as one-third greater than that of the right ventricle. Subsequent anatomical studies of such lungs revealed precapillary anastomoses exceeding 50 μ in diameter.

The conclusion to be drawn from these varied observations is that in diseased states involving such processes as chronic inflammation, collapse, emphysema, pulmonary artery thromboses, the evaluation of pulmonary circulatory haemodynamics becomes exceedingly complex. Certainly the evaluation of pressure–flow relationships in such conditions by the methods which are adequate for the healthy state is likely to yield results which are anomalous, and even grossly misleading if accepted uncritically.

Arterio-venous Shunts

Closely analogous to this question of broncho-pulmonary anastomoses is that of shunts between pulmonary arteries and veins. As already mentioned in discussing ventilation–perfusion relationships, there is definite physiological evidence in the form of the "venous admixture factor" that blood can pass from artery to vein without adequate exposure to alveolar gas. These methods, however, cannot yet differentiate clearly between blood which may have passed through such A.–V. shunts and that which has passed

through capillaries in ill-perfused alveoli. Prinzmetal *et al.* (1948) developed the elegant technique of estimating the size of minute vascular beds by releasing into the circulation glass spheres of different diameter. The maximum size of sphere and the proportion of them passing through to the venous side of a capillary territory obviously provides a good indication of the size and number of the available channels. Tobin and Zariquiey (1950) applied this technique to fresh human lungs and found (1) shunts up to 500 μ in diameter at the apices of the lobular subdivisions of the broncho-pulmonary segments; (2) smaller shunts of 50–100 μ diameter at the level of the smaller bronchi and respiratory bronchioles; and (3) 20–25 μ shunts near the alveolar sacs and the alveoli. In this connexion it must be emphasized that it is unlikely that the normal alveolar capillary greatly exceeds in diameter that of an erythrocyte. However, one must remember that the maximum size of particle which can pass through a muscular tube may be many times greater than its normal calibre, as peristaltic action seems to be a widespread characteristic of such structures.

Vessel Diameter

The third important factor in the Poiseuille equation (pressure and flow being the other two) is the radius of the tube, or in this case the mean radius of that portion of the pulmonary vascular system in which the largest pressure difference ($\triangle$P) exists. Now, in normal function we are entitled to believe, because flow increases threefold to fourfold with only a slight elevation of pressure, that the value of r adjusts so as to allow F to increase without change in P. This capacity of the pulmonary circulation to dilate, with increasing flow until a point is reached after which pressure increases quite rapidly, stimulates speculation about the nature of the peripheral resistance. May I remind you that what we are considering is "resistance to flow," which may be defined as the ratio of the pressure gradient to flow?

One of the simplest possible relationships is that in which equal increments of $\triangle$P cause equal increments of F, a state in which the ratio of $\triangle$P to F is a constant and r does not change.

The work of Donald *et al.* (1955) indicated a moderate increase in pulmonary artery pressure in the lower ranges while at high ranges of flow there may be rectilinear portions of the $\triangle$P-F curve. What physical change, however, can bring about the marked inflexion of the curve that occurs? The inference is that up to that point there is some mechanism which keeps down resistance so as to allow a progressive fall in the ratio $\triangle$P-F. Clearly that could be achieved in two ways: (*a*) by the opening of vessels which at low rates of flow are closed, and (*b*) by the increase in cross-sectional area of vessels already open. It is reasonable to presume that both mechanisms operate, each in its appropriate part of the lung. The increase in mean diameter of vessels required to accommodate a fourfold increase in flow is in the ratio of $1/\sqrt[4]{4}$ or 1/1.4. Although there is, so far as I know, no direct proof of it, I think that is the sort of mean adjustment that takes places in the larger branches of the larger vessels; while in the smallest vessels—that is, the alveolar capillaries—the mechanism is probably that of the opening of capillaries normally closed. Whether, however, the transition from one mechanism to the other is abrupt at some particular order of size of vessel is at present imponderable. At any rate, it is clear that, whereas there is no known functional disadvantage in some increase in diameter of the precapillary vessels, the whole function of capillaries, pulmonary or elsewhere in diffusion zones, requires them to retain in all circumstances a high ratio of surface area to radius. If this assumption be correct in regard to the increase in the capillary bed then such a fourfold increase should be associated with an increase in open alveolar capillaries of the order of 50%. Roughton (1945), in his admirable study of the mean time spent by blood in a lung capillary, reached an approximate solution of the increase of capillary volume during exercise when the blood flow increased from 4.7 to 16 litres/min.; this amounted to a ratio of 60/95—that is, around a 50% increase. There were no pulmonary artery or capillary pressure studies in his work, which was done before these became possible in intact man, but it is evident that the ratios and data obtained were of the same order as those which now emerge from the knowledge that increases of flow of this order are achieved without much elevation of pressure.

Work by Burton (1951) and Nichol *et al.* (1951) has shed light on the mechanisms of opening and closing of small blood vessels. He applied to small vessels the physical law enunciated by Laplace which governs the equilibrium of the wall of a cylindrical vessel. This states that the circumferential tension of the wall is the product of the pressure exerted on the inner surface and the radius of the vessel—that is, $T = P \times R$. Where the wall is not passive but can actively contract as can the muscular coat of a vessel, then there can arise a state in which the tension is so high in relation to the radius that the vessel closes—in fact, this law predicts that a small blood vessel must possess an intrinsic instability in which there is this "critical closing pressure" at which it is occluded. Some such mechanism provides a satisfactory explanation of many of the phenomena of capillary opening and closing, not only in the lung but elsewhere.

CONTROL OF PULMONARY CIRCULATION

Turning now to the control of the pulmonary circulation. There are naturally three groups of mechanisms to be considered: (*a*) those mediated by neurogenic means, (*b*) those induced by circulating substances, and (*c*) those due to alterations in the environment of the blood vessels mediated by local influence.

Nervous Control

The controversy on this question has been long and hotly debated. Many believe that the pulmonary circulation reflects passively the cardiac activity and systemic influences altering the distribution of blood between the two circuits. Time does not permit of any real review of the pros and cons of this weighty problem, only of the mention of some evidence in favour of the existence of nervous control. The other mechanisms are not in dispute, because the pulmonary system must inevitably adapt to the dynamics of the heart and major circulation. Many years ago Churchill and Cope (1929) demonstrated that alteration in pressure within the pulmonary vascular bed lowered systemic blood pressure and caused bradycardia, reactions which were abolished by vagal section. It has long been known that among the effects produced by multiple embolization of the arterial tree are action currents suggestive of a barrage of nerve impulses possibly originating in the plugged vessels.

Pearce and Whitteridge (1951) have studied the action currents in single fibres of the vagus and have identified impulses in phase with pulsation in the pulmonary artery and asynchronous with the aortic pressure wave. This pointed to the arterial side of the lesser circuit as containing the baroreceptors. Further evidence by Aviado *et al.* (1952) indicates that these are probably in the first part of the pulmonary artery. This is a readily acceptable hypothesis in view of the known location of such end organs in the embryologically analogous arch of the aorta (nerves of Cyon). The observations of Daly *et al.* (1938) suggesting the presence of pressure reflex zones in the pulmonary veins have also been supported. It hardly needs a critical application of another of Joseph Barcroft's famous principles—"The chance that a phenomenon has a significance"—to conclude that these nervous mechanisms are functionally important. Physiology has not led us to believe in the detecting, central transmission, and presumably recording of changes of state purely with a view to pigeon-holing without action. Such a purposeless phenomenon seems to be the prerogative of the bureaucratic machine.

We come now to possible effective mechanisms in pulmonary vascular innervation. Lilienthal and Riley (1954) state that the earliest observations which they can trace are those of Brown-Séquard in 1871, that mechanical stimuli

applied to certain neural structures elicited reactions which he concluded were transmitted peripherally along the dorsal sympathetic chain. In 1894 our illustrious former president John Rose Bradford, along with H. P. Dean, carried out an extensive investigation of the innervation of the pulmonary circulation in dogs. They observed simultaneously pressure in the pulmonary artery, a pulmonary vein, and a systemic artery during stimulation of various parts of nerves going to the lungs. They concluded that, while the vasomotor control of the lung vasculature was poorly developed and feeble as compared with the highly developed neurogenic control of the systemic circulation, its effects were functionally demonstrable as independent of changes in the systemic circuit. The outstanding work in this field during the last twenty-five years has been the systematic and progressive experimental analysis of this problem by Daly and his collaborators. They have studied the interplay of the parameters of the Poiseuille equation in the pulmonary vascular bed, initially in a simple canine heart–lung preparation, progressing step by step to the almost intact animal. Their accumulated evidence leaves virtually no doubt that substantial changes in these factors can be mediated both by vasoconstrictor and, to a less extent, by vasodilator impulses produced by stimulation of both adrenergic and cholinergic nerve supply.

The part played by neural control in the regulation of pulmonary haemodynamics in *human* health and disease is obscure. Certainly any of the operations that divide, in various ways, the cutaneous fibres of the upper sympathetic chain, the stellate ganglion, or the cardiac branches have not been associated with any gross alteration in pulmonary vascular function. The pulmonary hypertension which occurs in cerebral damage involving in particular the brain stem involves pulmonary veins, capillaries, and artery, and is often productive of pulmonary oedema. There seems little doubt that it is secondary to an abrupt and massive rise in systemic vasoconstriction resulting in acute left ventricular insufficiency, a state in all respects comparable to the left ventricular failure and passive pulmonary hypertension and oedema which may occur in acute glomerulonephritis, eclampsia, or extensive damage to the left ventricular myocardium as in infarction.

Effect of Circulating Substances

Space does not permit me to attempt any sort of critical evaluation of the influence of hormones, drugs, and "toxins" (used in the loosest sense). In this field it is very difficult to draw conclusions from observations in man because of the extreme difficulty in observing and recording simultaneously a sufficient number of variables to disentangle the effects on the systemic circuit, ventilation, etc., from those on the plain muscle in the walls of pulmonary arteries, capillaries, and veins. At the same time tests made in animals can be more comprehensive, but there is always the factor of species specificity to be reckoned with in any attempt to interpret human phenomena in their light. It can be said, however, that the following features characterize the extensive body of information available: (1) a capacity on the part of the pulmonary circulation to respond to a variety of biological agents and their antagonists. These responses tend to be comparatively slight in healthy states but may be large in diseased states; (2) a variability in response to such agents determined by the immediate environment and recent experience of the pulmonary circulation; and (3) a clear trend of evidence which indicates that the pulmonary circuit can respond in itself and that the reactions are not secondary to the systemic circuit changes.

Influence of Alveolar Gas Tensions

The discovery of the effect of gas tension on the pulmonary circulation is one of the most exciting developments of the last ten years. It starts with the observations of von Euler and Liljestrand (1946) that in the cat under chloralose anaesthesia and closed chest, anoxia or raised inspired CO_2 tension produced an increase of pulmonary arterial pressure which was independent of respiration or alterations in left auricular pressure and persisted after vagotomy or stellate ganglionectomy. They also noted the converse reaction that breathing a high concentration of oxygen lowered the P_{PA} below the normal room air level. Since then there has accumulated a mass of evidence that depression of alveolar O_2 raises pulmonary artery pressure. In man this effect was noted by Motley *et al.* (1947), and since then there has been a great weight of confirmatory evidence.

At first some uncertainty arose whether the elevation in P_{PA} was due simply to the elevation of flow that anoxia stimulated; however, later studies in which resistance was measured, using the pulmonary capillary or wedge pressure as the lower limit of the pressure gradient, have demonstrated clearly that the pressure required to drive unit blood flow is raised. This indicates conclusively that the cross-sectional area of the pulmonary bed (or πr^4 of the Poiseuille equation) is reduced. In these conclusions, of course, there is implicit the assumption that total or near total flow is measured by this particular application of the Fick principle. If a substantial amount of blood were introduced at high pressure into the pulmonary circuit, as for instance by the opening of shunts with the bronchial circuit, the conclusions would be invalid. I think this possibility can be disregarded, as there is no reason to believe that the bronchial circulation is capable of doing this at short notice. In disease states, however, as we have already seen, such a possibility cannot be lightly disregarded.

The practice of direct pressure measurement in the pulmonary circuit of cases of cardio-pulmonary disease has revealed some extremely interesting relationships. It seems clear that in mitral stenosis there is elevation of pulmonary venous and capillary pressures inversely proportional to the reduction in area of the mitral orifice. This is the inevitable result of maintained flow through a reduced bore. The elevation of capillary pressure dare not exceed for any length of time the oncotic pressure of the blood, as death then occurs from pulmonary oedema. However there also occurs in the evolution of mitral stenosis a disproportionately great elevation of pulmonary artery pressure, which may increase fourfold the pulmonary artery/pulmonary capillary gradient (Wood, 1954). This indicates that the vessels lying between the pulmonary artery and the capillaries offer an abnormally small lumen, or, put differently, they fail to relax so as to allow flow without this gross hypertension. Much speculation has arisen about the nature of this loss of distensibility of the pre-capillary vessels.

The morbid anatomical observations of Brenner (1935), Parker and Weiss (1936), and others seem to me to provide a reasonable explanation. These workers have demonstrated in mitral stenosis a thickening of the pulmonary vessel walls particularly marked in the subintimal zone. This thickening may well be due to the "back pressure." Its inevitable result is to reduce the lumen and to greatly impair distensibility, or, put more dynamically, to alter the volume-elasticity characteristics of the pulmonary vascular bed. The effect of this is to require a greater pressure to maintain flow. I fully realize that the validity of this hypothesis requires proof that these structural changes develop hand in hand with increase in the artery/capillary gradient. It is quite possible that they are the result and not the cause of the elevation of pressure, as seems to be the case in systemic hypertension.

Conclusion

In conclusion I would emphasize that I have reviewed, of necessity superficially, much that is old and a little that is comparatively new concerning the three vital zones in the lung—that is, the alveolar gas, the alveolar capillary, and the intervening tissue septum. I have attempted to demonstrate that pulmonary disease can be portrayed in terms of quantitative dynamic relationships providing concepts complementary to and at least as useful as those

based on the necropsy, the microscopical preparation, and the radiograph. The task has given me many hours of happy toil. I hope that I have in a small way discharged the obligation of Dr. George Oliver to "encourage the application of physiological knowledge to the prevention and cure of disease."

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CLINICAL OBSERVATIONS ON VENO-OCCLUSIVE DISEASE OF THE LIVER IN JAMAICAN ADULTS

BY

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Veno-occlusive disease of the liver (V.O.D.) is a term given on histological grounds to a form of liver disease occurring frequently in Jamaican children and occasionally in adults (Bras *et al.*, 1954a, 1954b). The clinical features in children have been fully described by Rhodes (1954) and Jelliffe *et al.* (1954). Sometimes two or more members of the same family are affected. The disease is divided into three often ill-defined and overlapping stages. The acute stage is characterized by the sudden development of abdominal pain, hepatomegaly, often gross, and usually considerable ascites. Vomiting is common. Slight splenomegaly and ankle oedema sometimes occur. Children between the ages of 18 months and 3 years are primarily affected. Rhodes (1954) drew attention to the fact that the condition is often precipitated by other illnesses such as whooping-cough, respiratory infections, etc. Repeated paracenteses may be required in the acute stage; but subsidence of the hepatomegaly and ascites may occur with remarkable rapidity, sometimes disappearing completely in seven to fourteen days. The majority of patients appear to recover completely; but some die in the acute stage of liver failure (Bras *et al.*, 1954a, 1954b). The acute stage may pass, often imperceptibly, into the subacute stage of the disease: or it may be subacute apparently from the onset (Jelliffe *et al.*, 1954).

The subacute stage is characterized by a firm persistent hepatomegaly, and sometimes recurring ascites. It is often symptom-free, with the patient maintaining apparently normal health, and it is discovered only on routine examination or on examination for an unassociated complaint. The spleen is usually enlarged at this stage. Jaundice is rare in any stage of the disease except terminally. It would appear that complete resolution may occur even in the subacute stage of the condition. Alternatively, this stage may pass into the chronic stage of the disease. Acute episodes may occur in both the subacute and chronic stages.

The clinical features in the chronic stage are similar to those of any other form of cirrhosis, and often indistinguishable from them. It would appear, however, to progress more rapidly than cirrhosis from other causes. Death in this stage is often due to haematemeses from ruptured oesophageal varices. Hepatic failure and cholaemia are also frequent causes of death.

Theories of aetiology of this syndrome have been discussed in previous papers (Bras *et al.*, 1954a, 1954b; Rhodes, 1954). While it is possible that there is no uniform aetiology, there are certain common factors that appear to underly this syndrome in Jamaica. All the cases seen here occur in the poorer economic groups, and, although the clinical stigmata of malnutrition are often minimal or absent, malnutrition or subnutrition, as judged from available dietary histories, forms the unvarying background to this disease (Rhodes, 1954).

Liver Function Tests of Cases Reported in Text

	Case 1				Case 2	Case 3		Case 4	
	No Symptoms	Onset of Illness	Height of Illness	Recovery	On Admission	First Admission	Second Admission	Onset of Illness	Two Days Before Death
Bilirubin (direct) (mg./100 ml.)	0·1	1·06	2·6	1·2	—	2·7	2·3	0·9	6·4
,, (indirect) (mg./100 ml.)	0·5	2·0	4·0	2·4	—	6·0	6·4	1·1	9·8
Thymol turbidity (units)	2·8	1·6	2·1	2·9	3·1	7·7	6·4	2·1	5·1
Thymol flocculation	+	Neg.	+++	+	++	++++	++++	+	++
Gamma-globulin (Kunkel) units	10·8	13·2	18·2	16·8	32·1	40·0	42·4	16·1	25·0
Cephalin cholesterol flocculation	+	++	++++	+	+++	++++	+++	++	++++
Total protein (g./100 ml.)	8·5	5·8	5·6	7·7	6·5	8·4	7·5	6·0	6·3
Albumin ,,	4·3	2·9	2·5	4·2	2·0	2·3	2·7	2·7	2·6
Globulin ,,	4·2	2·9	3·1	3·5	4·5	6·1	4·8	3·3	3·7
Cholinesterase (Michel) (units)	0·61	0·36	0·13	0·75	0·10	0·15	0·08	0·26	0·10

This economic group habitually drinks a variety of "bush teas," which are infusions of various herbs, seeds, and roots, either medicinally or for food. Asprey and Thornton (1954) have classified and listed nearly 200 plants so used. It is conceivable that many of these may be misused, with toxic results, particularly in malnourished individuals.

Previous reports on this syndrome in Jamaica have been concerned mainly with its effects in children (Bras *et al.*, 1954a, 1954b; Jelliffe *et al.*, 1954; Hill *et al.*, 1953). The present paper deals with the clinical features and pathological findings in four cases of V.O.D. in Jamaican adults. In Case 1 we were able to get a detailed history of an increased number of bush teas taken immediately before the onset of illness.

The histology has been studied from serial liver biopsy specimens obtained by the Vim–Silverman needle, using the modified technique described by Hoffbauer (1947), and from post-mortem material. Liver-function tests on all cases are summarized in the Table.

Case 1

A 33-year-old Jamaican man was first seen on December 31, 1953, complaining of having had cough and occasional blood-stained sputum for the previous four months. There was some loss of appetite, but no weight loss or any other relevant symptoms. He had been *x*-rayed at the local chest clinic and told that he had pulmonary tuberculosis. Domiciliary treatment was started; and he had been in bed for two months before attending here. He had always taken a variety of "bush teas," and at the onset of his illness he added a number of others for their supposed medicinal value. These included donkey weed (*Stylosanthes hamata*), dandelion seeds (*Cassia ligustrina*), Cerasee (*Momordica charantia*), Jack-in-the-bush (*Eupatorium odoratum*), Nicker (*Caesalpinia bonducella*), and simple bible (*Aloe vulgaris*). There were no other relevant points in his previous history, and nothing significant in his family history.

On examination he was found to be a man of good physique, 6 ft. 2 in. (188 cm.) in height, and well proportioned. Physical findings at the time were completely negative except for a few persistent moist rales at the right lung base. His liver and spleen were not enlarged and there was no ascites. His haemoglobin was 15 g. per 100 ml., erythrocyte sedimentation rate 3 mm. in the first hour (Wintrobe), and repeated sputum examinations were negative for tubercle bacilli. A chest *x*-ray examination showed no signs of pulmonary tuberculosis; but there was increased shadowing of the right base, with localized emphysema and pleural thickening. The lesser fissure was depressed and the appearances suggested partial collapse of the right middle lobe. Liver-function tests were within normal limits (see Table). He was kept under close observation as an out-patient for the next ten weeks, during which time his condition remained unchanged.

On March 3, 1954, nine weeks after his first visit and one week after his last out-patient visit, he attended complaining of severe abdominal pain and distension, and anorexia. His symptoms had started two days before, and he had vomited twice. He had also noticed a marked reduction in his urinary output. His weight had increased from 88.5 to 93 kg. in one week.

He was afebrile, but obviously ill and in acute discomfort. There was no anaemia, jaundice, or oedema. The chest signs were unchanged, and the cardiovascular and central nervous system examinations were again normal. There was now a tense ascites, and the liver was enlarged about 10 cm. below the costal margin (Fig. 1) and very tender. The spleen could not be palpated. He was admitted to hospital with a diagnosis of acute veno-occlusive disease of the liver.

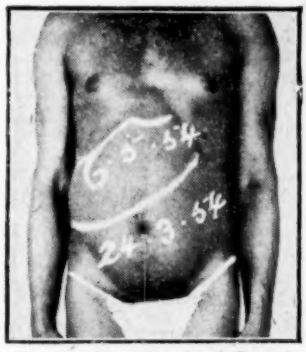

FIG. 1.—Photograph of Case 1, showing changes in size of liver.

Investigations.—Liver-function tests on admission showed impairment (see Table). Other laboratory investigations, including haematological examination and tests for sickling, serological tests for syphilis, and blood electrolytes, were normal. A chest *x*-ray film showed no change from the previous one.

Treatment and Progress

He was immediately put on a high-protein diet (150 g. a day), intramuscular injections of mersalyl, 2 ml. on alternate days, and restricted fluid and salt intake. The liver continued to increase in size until in two weeks it was palpable 14 cm. below the costal margin, and repeated paracenteses were required. Polyacrylic-carboxylic acid resin ("resodec"), 15 g. three times daily by mouth, was then added to the treatment schedule without any effect on the accumulation of ascitic fluid. Severe abdominal pain, and nausea with occasional vomiting, continued. There was

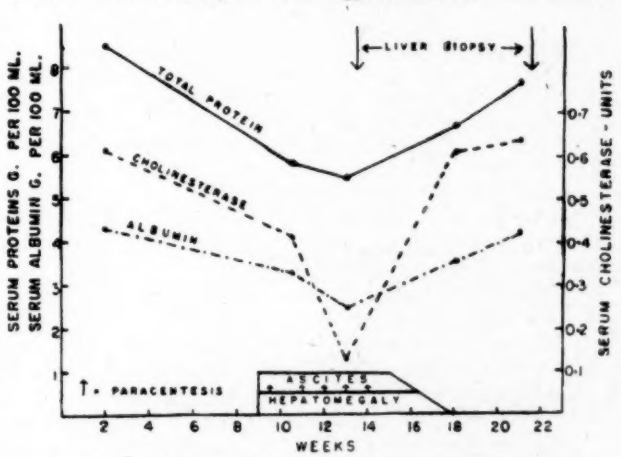

FIG. 2.—Case 1. Clinical and laboratory features.

further deterioration in liver-function tests. A liver biopsy at this stage showed the changes of acute V.O.D.

After six weeks the ascitic fluid ceased to accumulate and the patient became clinically clear of ascites in ten days. The hepatomegaly disappeared in 21 days. This was paralleled by symptomatic improvement and improvement in tests of liver function (Fig. 2). He was discharged well ten weeks after admission, and readmitted three weeks later for a second liver biopsy.

Sputum culture for tubercle was positive just before his discharge from hospital; and on this account he was given 200 mg. of isoniazid daily by mouth and 1 g. of streptomycin twice weekly by intramuscular injection as an out-patient. This did not appear to have any relationship to his liver disease. When last seen in October, 1954, five months after discharge from hospital, he was well and free of symptoms except for slight occasional abdominal discomfort. His liver-function tests have remained normal and there has been no recurrence of ascites or hepatomegaly.

Histology

The first biopsy showed the classical picture of acute V.O.D. with intimal thickening of the hepatic vein branches, associated with severe congestion and sinusoidal dilatation (Bras *et al.*, 1954a, 1954b). The hepatic cells in the centrilobular areas were compressed owing to the widening of the sinusoids, otherwise the liver lobules showed normal cells. The second biopsy, three months later, showed nothing worthy of remark in the sinusoids. There was only slight residual intimal thickening in some of the hepatic veins. There was no discernible increase in reticulin.

Comment

A case of acute V.O.D. with clinical and histological recovery. We were fortunate in being able to observe this patient in the out-patient department for nine weeks before the onset of his illness. Two interesting features are (1) the onset soon after the addition of a number of "bush teas" to his diet, and (2) the rapid and unexplained subsidence of ascites and hepatomegaly after the sixth week of illness (Fig. 1).

Case 2

An 18-year-old Jamaican girl was admitted to hospital in October, 1952, with a twelve-days history of abdominal distension with severe pain, anorexia, and vomiting. There was nothing significant in her own or her family history. She had been in the habit of taking "bush teas" frequently. Her diet had always been predominantly carbohydrate with very little protein.

On examination she was found to be underweight (41 kg.) and obviously undernourished, with an angular stomatitis, cheilosis, and glossitis, and loss of normal skin texture and elasticity. There was no jaundice or pyrexia. The liver was tender, firm, irregular, and enlarged as far as the umbilicus. All investigations were negative except the liver-function tests, which showed gross impairment (see Table).

Treatment was started as in Case 1. The response was extremely slow, repeated paracenteses being required over a period of five months. Accumulation of ascitic fluid then gradually decreased, and she was discharged clinically much improved and free of ascites seven months after admission. There was, however, little improvement in her liver-function tests and a firm irregular hepatomegaly persisted. She was followed up in the out-patient department for two months after discharge, during which time there was no clinical deterioration. She died suddenly at home three weeks after her last out-patient visit, following a massive haematemesis. A post-mortem examination was not made.

Histology

Serial liver biopsies were performed on this patient while in hospital. The first biopsy one week after admission again showed sinusoidal widening surrounding partly or completely occluded hepatic veins. There was also a condensation and an increase in reticulin fibres in the centrilobular areas. The second biopsy, four weeks later, showed very little difference except that the fibrosis had increased appreciably. The liver cells showed regenerative phenomena such as mitoses. The third biopsy, four months after the first, gave essentially the same picture, but the non-portal fibrosis had progressed markedly.

Comment

Chronic V.O.D. often presents for the first time as suddenly as the acute stage of the disease; and these acute exacerbations may recur at varying intervals throughout the course of the illness. The absence of any history of the preceding acute or subacute stage is to be noted. By serial liver biopsies it was possible to observe progression of the fibrosis in spite of apparent clinical improvement.

Case 3

A 45-year-old Jamaican was admitted to hospital in September, 1953, with a history of loss of appetite, loss of weight, and listlessness for two months. Three days before admission his anorexia became worse, and he developed central abdominal pain and vomited after each meal.

On examination he was thin and wasted, his conjunctivae were injected, and he was jaundiced. There was generalized abdominal tenderness, but no ascites. His liver and spleen were not enlarged, and he was afebrile. All investigations, including chest *x*-ray examination, haematological examination, and serological tests for syphilis, were normal except the liver-function tests, which revealed marked impairment (see Table).

A diagnosis of infectious hepatitis was made; liver biopsy was not performed. Response to treatment was rapid, and on discharge in 18 days the patient had a normal appetite and the jaundice had almost cleared.

He was followed up in the out-patient department and seemed to be progressing favourably for three months, when he attended again complaining of severe abdominal pain and distension, nausea and vomiting, deepening jaundice, and reduction in urinary flow. On examination his jaundice was seen to have deepened considerably since his last visit one month previously. There was also a tense ascites with marked abdominal tenderness, and a very firm liver could now be palpated one fingerbreadth below the costal margin. Liver-function tests again showed marked abnormalities. A diagnosis of post-necrotic scarring following severe infectious hepatitis was made because of his previous history. His condition deteriorated rapidly in spite of

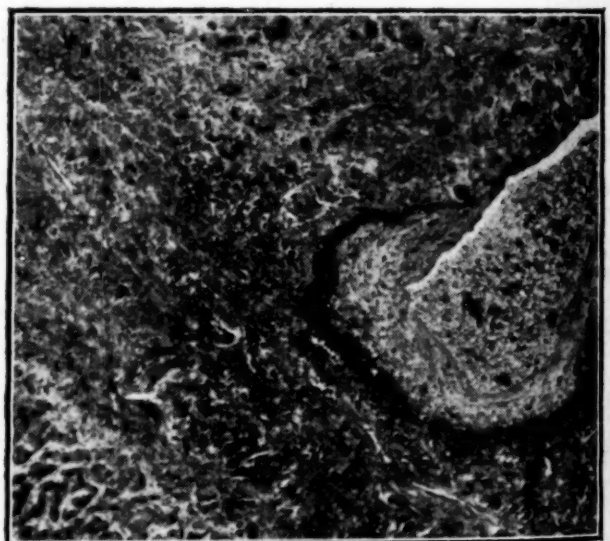

FIG. 3.—Case 3. Area of scarring in the liver. There is a branch of the hepatic vein with subintimal thickening and narrowing of the lumen. Mallory-trichrome stain. (×70.)

vigorous treatment. The jaundice increased, repeated haematemeses occurred, and he died five days after his second admission, in hepatic coma.

Necropsy Findings

The liver weighed 840 g. The capsule was irregularly thickened and the liver surface coarsely nodular. The liver edge was sharp. On cut section a pseudo-lobulation was present throughout the liver, the pseudo-lobules being up to 5 mm. in diameter. The gross aspect was not unlike that of post-necrotic scarring. The histology, however, revealed a typical picture of acute-on-chronic V.O.D. in addition to post-necrotic scarring. Fig. 3 gives the appearance of a branch of the hepatic vein. The necropsy further revealed jaundice, 1,200 ml. of straw-coloured ascitic fluid, congestive splenomegaly, a moderate degree of lung oedema, adhesive pleurisy on both sides, and arteriosclerosis.

Comment

The presentation with jaundice, and without ascites or hepatomegaly, was unlike acute V.O.D., and because no biopsy was performed that diagnosis was not considered. From the appearance at necropsy, however, it is possible that V.O.D. was present at the time of the first admission, and that infectious hepatitis then occurred on a background of the V.O.D. type of liver injury.

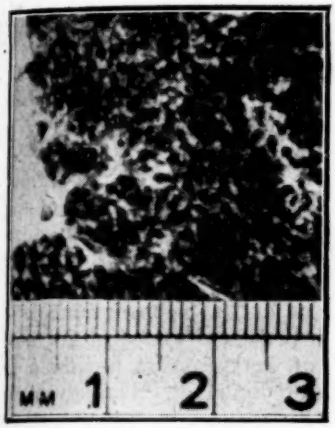

FIG. 4.—Case 4. Cut surface of liver. Note the remarkable mottled appearance caused by extreme centrilobular congestion.

Case 4

A 16 - year - old Jamaican girl was admitted to hospital in July, 1954, with a history of abdominal swelling and pain with repeated vomiting for one week. The girl was a mongol and apparently very neglected. A detailed history could not be obtained from the relative who attended with her, but her diet was obviously grossly deficient in protein. She was said to have been in good health up to this illness. Nothing of significance could be elicited from her own or her family history.

On examination she showed the physical and mental characteristics of mongolism. She was afebrile. There was no jaundice or anaemia. There was a tense ascites, and the liver was firm and tender and enlarged as far as the umbilicus. The spleen was not palpable. Chest *x*-ray examination, haematological investigations, and syphilis serology were normal. Liver-function tests gave abnormal results (see Table). Paracentesis was performed on admission with considerable relief of abdominal pain, and a liver biopsy done at the same time showed the changes of acute V.O.D.

Her condition remained unchanged for five days after treatment started. Jaundice then appeared for the first time and rapidly deepened. This was followed by the development of stomatitis, subconjunctival haemorrhages, and a generalized purpuric rash. Liver-function tests showed further impairment. Her clinical condition deteriorated rapidly, and she died in liver failure 18 days after admission.

FIG. 5.—Case 4. Branch of hepatic vein. There is marked occlusion of the lumen through subintimal thickening of the wall. Mallory-trichrome stain. (×180.)

Pathology

The liver biopsy specimen showed the typical changes of acute V.O.D. At necropsy, two weeks later, the liver weighed 1,275 g.; the cut surface showed the striking mottled appearance of acute V.O.D. (Bras *et al.*, 1954a, 1954b), and this was confirmed by histological examination (Figs. 4 and 5). There was only about 100 ml. of amber-coloured ascitic fluid in the peritoneum at the time of death.

Discussion

Diagnosis

The diagnosis is usually readily made in the acute stage from the history, the characteristic clinical picture, and the liver biopsy findings. When seen for the first time in the chronic stage the clinical picture is frequently indistinguishable from that produced by any other form of cirrhosis; and when of long standing it is often impossible to trace its evolution either clinically or histologically. We, however, suspect it (*a*) when there is a past history of the acute or subacute stage; (*b*) when cirrhosis occurs at an unusually early age; (*c*) at any age when the onset of ascites with or without hepatomegaly is unusually acute; and (*d*) when cirrhosis is associated with the relatively early development of oesophageal varices and haematemeses, distended abdominal veins, and other signs of intrahepatic obstruction. The latter feature we attribute to the nature of the histological lesion within the liver.

When the chronic stage presents for the first time in an acute phase, as in Case 2, the differential diagnosis from primary or secondary carcinoma of the liver may be difficult. If liver biopsy is contraindicated, peritoneoscopy is sometimes a useful method of differentiating the two conditions.

Liver-function tests are usually only moderately upset at the onset and become progressively impaired with advancement of the condition. They do not conform to any definite pattern, and are of more assistance in assessing progress and response to treatment than in arriving at a diagnosis. We find the serum albumin and cholinesterase of greatest value in this respect (Fig. 2).

Mechanisms

Previous reports on hepatic venous occlusion (Chiari, 1899; Rao, 1935; Teilum, 1949) have been based on post-mortem material in fatal cases. By serial liver biopsies, in the present series of cases, it has been possible to demonstrate the reversibility of the hepatic venous occlusion in the early stages of the disease, and how closely it relates to changes in liver-function tests and the appearance and disappearance of ascites and hepatomegaly (Case 1). Liver biopsy also shows that the enlargement of the liver is due

to vascular congestion produced by this occlusion of the hepatic venous radicles. It would appear that, if the hepatic congestion is severe and prolonged, hepatic failure with jaundice, cholaemia, and death may occur in any stage of the disease (Cases 3 and 4); if it is of short duration, complete recovery may occur (Case 1); if it is moderate and prolonged, death of liver cells and fibrosis occur with the usual mechanical results of hepatic fibrosis (Case 2).

The rapidity of appearance and disappearance of ascites in acute V.O.D. and its high protein content (usually 2 to 2.5 g.%) parallel very closely the events in acute experimental ascites in animals (Schilling *et al.*, 1952). In cirrhosis from any other cause and in the cirrhosis of chronic V.O.D. it is likely that one or more of several factors might be operative together—circulatory and hydrostatic, osmotic, inflammatory, nutritional, renal, endocrine, etc. In acute V.O.D., however, it would appear that we are dealing with the immediate mechanical effects of acute hepatic congestion produced by occlusion of the hepatic veins. The liver, as it were, becomes "stuffed" with blood through this impediment to venous drainage. The hepatomegaly and ascites so produced, in the early stages of the disease at any rate, sometimes disappear as promptly as they do in the "ascitic" dog preparation with release of vena caval constriction.

Treatment

The cause is still undetermined, and the treatment necessarily remains empirical and symptomatic. The diet of these patients is invariably deficient in proteins, although there may be an adequate calorie intake. It seems reasonable that an adequate protein intake should be sought in these patients both to improve nutrition and to slow the rate of ascites accumulation. In this connexion Kark *et al.* (1951) have postulated that severe protein depletion may directly influence capillary permeability favouring augmented ascites formation. A high-protein diet with added vitamins has been our main dietary regimen to date. Many patients show a dramatic response to these measures, bed rest, limited salt intake, and adequate attention to fluid balance. The natural history of the disease, however, is not fully known, and it would appear to be so variable and unpredictable that it is difficult to assess properly the importance of any therapeutic measures. Control studies along these lines have been started.

When accumulation of ascitic fluid is excessive repeated paracenteses may be necessary. With frequent paracenteses symptoms of hyponatraemia may develop, and the serum proteins become even more depleted. We have had little experience of the use of the various surgical procedures that have been used successfully in eliminating stubborn ascites and reducing the incidence of haematemeses. Their place, however, in selected cases of portal hypertension is well established.

Summary

The clinical features of veno-occlusive disease of the liver (V.O.D.) in Jamaica are described, with details of four cases occurring in adults.

The mechanisms of hepatomegaly and ascites formation are briefly considered. It is thought that in acute cases they are the mechanical results of hepatic congestion produced by occlusion of the hepatic venous radicles. A comparison has been drawn with the experimental ascites produced by ligation of the thoracic inferior vena cava in animals.

Treatment with a high-protein diet and fluid and salt restriction is suggested. The difficulty in assessing response to treatment is stressed.

We wish to thank Professor E. K. Cruickshank for permission to publish Case 1, and Miss E. Tomlinson and the staff of the Chemical Pathology Department for doing the liver-function tests.

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TREATMENT OF PARKINSONISM WITH A NEW COMPOUND (B.S. 5930)

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The correct management of patients suffering from Parkinsonism in all its forms still remains one of the most difficult problems in therapeutics. Many so-called "spasmolytic" agents have been tried in this condition with variable success. Most compounds of this group have both an antihistamine and a parasympathicolytic effect, and it would appear that the drugs which are most useful in the treatment of Parkinsonism are those in which the latter effect is predominant. The advent of a new compound with pronounced anti-acetylcholine activity was felt to be of considerable interest as a possible addition to the range of drugs available for the alleviation of the distressing symptoms of the Parkinson syndrome.

Pharmacology

The new compound (B.S. 5930) is β-dimethylamino-ethyl-2-methylbenzhydryl hydrochloride. It belongs to a class of which the best-known example is the antihistamine agent diphenhydramine hydrochloride. This class of compound antagonizes both histamine and acetylcholine. Investigations into substitution in the benzhydryl group gave the rather unexpected result that substitution of a methyl group at the ortho (2) position produces a very much increased anti-acetylcholine effect and a very much reduced antihistamine action.

The toxicity of B.S. 5930 is about the same as that of diphenhydramine, the $L.D._{50}$ in mice being approximately 200 mg./kg. subcutaneously and 25 mg./kg. intravenously.

Patients in this trial were given 150 mg. of B.S. 5930 daily, divided into three doses of 50 mg. each. In some cases the amount was increased to 250 mg. daily. If the amount was raised above 250 mg. signs of intolerance developed, including restlessness, slight blurring of vision, and nausea. Little trouble was encountered from unpleasant side-effects when the daily dose was below 250 mg. In only one instance was the daily amount

reduced below 150 mg.; this was because of acute retention of urine. The bladder emptied spontaneously on the day after stopping the tablets, and this symptom did not occur again when the drug was given in reduced dosage.

Design of the Trial

Past experience suggested that it was extremely unlikely that the drug would prove to be either effective in all cases or ineffective in all cases, and it was felt that the method of carrying out the trial should allow for clinical evaluation of the relationship of the new compound to other drugs as well as maintaining statistical control of the experiment. Fig. 1 illustrates the method diagrammatically.

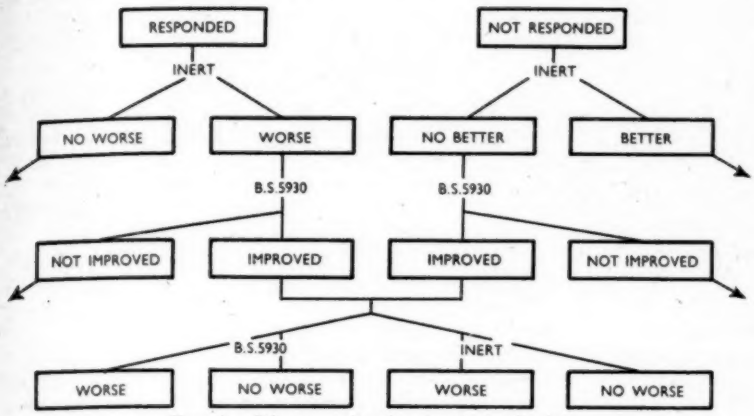

FIG. 1.—Diagram showing method of trial.

The names of 75 patients were selected at random from a list of those attending the Parkinson Clinic at Dudley Road Hospital. Two patients failed to attend the follow-up clinics, so that the trial began with 73 patients. They had previously been treated with compounds such as benzhexol hydrochloride, ethopropazine hydrochloride, caramiphen hydrochloride, and the solanaceous alkaloids, either alone or in combination. In all cases previous therapy had continued over a long enough period for the results to be classed arbitrarily as either "responded to treatment" or "not responded to treatment."

Data on each patient were recorded on a form, and included assessment of the ability to stand unaided, to walk, to turn corners, to climb stairs, and to write; particular attention was paid to ability to perform personal management of the daily toilet and of household chores. Assessment was also made of rigidity, tremors, "tics," cramps, sialorrhoea, lacrimation, oculogyric crises, and mental state.

For the first two weeks all patients were given inert tablets resembling B.S. 5930 and were reassessed at the end of this period. Those who were in the "responded" group on previous treatment were classed as either "no worse" or "worse," and those in the "not responded" group as either "no better" or "better." Patients who had "responded" to previous therapy but were "no worse" on the inert tablets could not be regarded as having derived benefit from active treatment. In order to minimize the dilution of the final figures they were eliminated from the trial. The one patient from the "not responded" group who was "better" on the inert tablets was also eliminated for similar reasons.

The remaining patients were then given the drug. They were seen at regular intervals, and where it was felt necessary the dose was adjusted.

A preliminary assessment was made at the end of three months, and those patients who were obviously deriving no benefit from the treatment were given a final classification of "not improved" and returned to their original treatment. The others continued for a further three months, and at the end of this period they were again assessed as "improved" or "not improved."

At this stage of the trial it was possible to give a clinical evaluation of the drug and to estimate its worth in relation to previous treatment. It now remained to test the validity of the assumption that in cases in the "improved" group the improvement was due to administration of the drug. In order to make this test the "improved" group was divided into two subgroups. The two subgroups were selected by one of us (A. H. R.), after careful examination of the forms, in order to keep them as balanced as possible. A card index of the patients' names was prepared and each patient was allocated a code reference. This index, together with correspondingly coded bottles of tablets, was handed to a third party, who dispensed the tablets. Whether a given patient received active or inert tablets was unknown to either the clinician (R. O. G.) or the person dispensing the tablets. After two weeks the patients were classed as either "worse" or "no worse."

Material

Of the 67 patients to whom the new drug was administered, 32 were males and 35 females. Their ages ranged from 33 to 78 years, the distribution by age groups being as follows: eight were between 31 and 40; 17 between 41 and 50; 13 between 51 and 60; 19 between 61 and 70; and 10 between 71 and 80.

There is so little established fact about the underlying aetiology of the Parkinson syndrome that it is felt that any attempt to make a detailed classification is of no practical value. The patients in this series were grouped as being post-encephalitic if there was a history of encephalitis; as arteriosclerotic if there was a demonstrable associated arteriosclerosis; as idiopathic if there was no obvious cause. There were three patients in the post-encephalitic group; 37 in the arteriosclerotic group; and 27 in the idiopathic group.

Results

Of the 75 patients chosen at random for the trial, two failed to attend the clinic. The remaining 73 patients consisted of 55 who had responded to previous treatment and 18 who had not responded (Fig. 2). After two weeks' administration of inert tablets 50 of the "responded" group were worse and five were no worse. In the "not responded" group 17 were no better and one was better on the inert tablets. Elimination of the five who were no worse and the one who was better left 67 patients still in the trial, and these were treated with B.S. 5930. At the clinical evaluation stage (line III in Fig. 2) 14 of the 50 from the "responded"

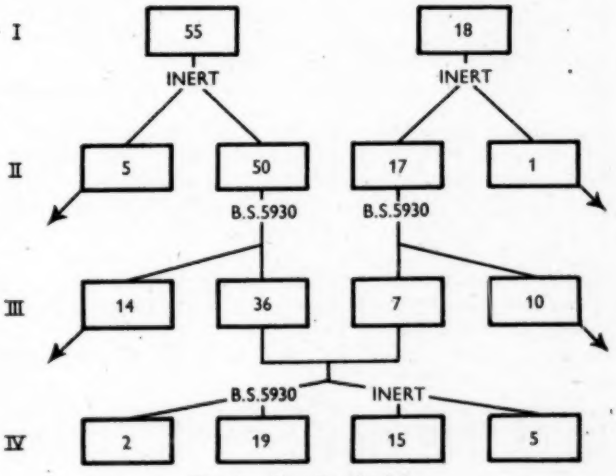

FIG. 2.—Results of trial.

group were "not improved" and 36 were "improved"; of the 17 from the "not responded" group 7 were "improved" and 10 "not improved." Details of the clinical evaluation are given below. The 24 who were "not improved" were eliminated from the trial at this stage, leaving 43 for the validity test. Of these, one had left the district and another failed to attend the clinic, so that the actual number of patients involved in the final stage of the trial was 41. In the two subgroups 21 received active tablets and 20 received inert tablets.

In the final stage of the trial the clinician has only the choice of classifying the patient as "no worse" or "worse." On the assumption that any improvement was due to the drug and that the clinical judgment was infallible it would be expected that all patients who receive active tablets in the final stage would be classed as "no worse" and that all patients who received inert tablets would be classed as "worse." On the null hypothesis—that improvement was not due to the drug—the final assessment would be due to pure chance. In this event it would be expected that half the patients in each group would be classed as "no worse" irrespective of the type of tablet given.

At the final evaluation in this trial (line IV in Fig. 2) 19 of the 21 patients receiving active tablets were classed as "no worse" and 15 of the 20 patients receiving inert tablets were classed as "worse." On a basis of pure chance—that is, where $p=q=0.5$—the probability of this result is given by the sum of the first eight terms of the expansion of $(0.5+0.5)^{41}$, which gives $p=1.18\times10^{-5}$. In other words, the chance association of maintenance or deterioration of the patients' condition with the type of tablet given could be expected to occur with this, or greater, degree of correlation about once in 80,000 trials. It is extremely unlikely, therefore, that the association is due to chance.

The question of modification of the clinical evaluation in the light of the final stage of the trial is discussed below.

Clinical Evaluation

Clinical evaluation of the effect of treatment was based on an overall review of the subjective and objective phenomena listed in the form. An attempt was made to carry out the evaluation on a points system, but the wide diversity of the presenting symptoms and the varying severity made this impracticable. On the scheme of the trial (line III in Fig. 2) the primary division was made into "improved" and "not improved." For purposes of comparison the "improved" group was arbitrarily classed as follows: "Excellent" in those cases in which the symptoms were completely alleviated or, with particular regard to tremor, were diminished to the point of no longer interfering with the patient's normal activity; "good" where there was residual tremor but not sufficient to cause serious interference with the patient's daily life; "worth while" where the residual symptoms still caused serious interference with the patient's daily life but the scope of activity, especially with respect to the ability to perform personal toilet, was increased. In the group who had responded to previous treatment, 15 were classed as excellent, 15 as good, 6 as worthwhile, and 14 as not improved. In the group who had not responded to previous treatment, one patient was classed as excellent, two were classed as good, four as worth while, and ten as not improved.

The results in the group who had responded to previous treatment were compared with the condition at the beginning of the trial, and it was considered that 25 were better than they had been originally, 8 were the same, and 17 were worse.

Taking into account the patients in the "not responded" group from the beginning of the trial, it was considered that 43 of the 67 patients had derived benefit from treatment and 31 were better than on any other previous treatment. It is concluded that B.S. 5930 compares favourably with other drugs for the treatment of the Parkinson syndrome, and it is a most useful addition to the range available at the present time. This conclusion is not affected by the modification of the clinical evaluation discussed below.

Discussion

The Parkinson syndrome is an example of the type of condition of which the aetiology is far from clear. The similarity of the disabilities which bring the patient to seek medical advice results in the loose grouping together under one heading of the end-effects of a number of differing causes. Treatment of these conditions is usually directed at alleviation of the symptoms rather than the removal of the underlying cause, and, because of this, is largely empirical. It is not surprising to find that a given drug is not equally effective in all cases. On the other hand, although the drug may not alleviate the symptoms in all cases, if it has certain basic characteristics it can be expected to produce a measure of relief in some. The clinical trial of a new compound for the treatment of this type of condition should be directed at providing information of the relative efficacy in comparison with previous methods of treatment. When the number of patients in the trial is small this comparison is, of necessity, a matter for the experienced clinician. Methods of statistical control, although highly desirable, should not interfere with the clinician's freedom of action.

One method in frequent use for the trial of new compounds is the "double-blind" test, in which active and inert material is given at random without the patient knowing which he is receiving and without the clinician knowing which he is giving. It is customary to carry out this type of trial on patients attending for the first time in order to avoid any complications from the patient's having received previous treatment. Comparison with other drugs can be achieved only by considerable elaboration of the trial.

A further disadvantage of the "double-blind" test is that if the drug is effective in only relatively few cases large numbers are required for the trial to reach a level of statistical significance. In conditions of high incidence and distressing symptoms, such as the Parkinson syndrome, a drug which is genuinely effective in only 10% of cases is still of value. The results of the present trial suggest that there will be an apparent response to treatment with inert material in about 10% of cases also. Under these circumstances a "double-blind" trial would require not less than 100 patients in both the treated and untreated groups to reach the $p=0.05$ level of significance. Apart from the problem of obtaining numbers, it is extremely difficult to justify the withholding of treatment from a large number of patients for a long period of time.

The present trial was designed to obtain the maximum information from the number of patients readily available. The test of validity was made at the point where it would inconvenience the minimum number of patients.

At the end of the first stage of the trial (line II in Fig. 2) those patients who could be expected to respond to any form of treatment are revealed and eliminated from the trial. Those remaining do not respond to treatment with the inert tablets used. The elimination of the first group at this stage removes a confusing factor from the trial. The second group, however, will still include the type of patient who reacts adversely to any change of treatment. A refinement of the method would be to give patients in the "responded" group inert tablets which were similar in appearance to those they were receiving originally. The diversity of treatments received by the patients in the present series made this procedure impracticable, and as the results weigh against the new drug rather than in its favour it was not adopted.

The second stage of the trial (line III in Fig. 2) was carried out in two parts. After three months' treatment with the new compound those patients who had obviously not shown a response were returned to their original therapy and

recorded as "not improved." Those who had responded, and also the doubtful cases, remained under treatment for a further three months. The intermediate assessment was made on the grounds that effective treatment should not be withheld from the "not improved" cases. The continuation of treatment was primarily to ascertain if tolerance for the drug developed. No signs of drug tolerance were observed at the clinical evaluation stage and none have been observed since.

The final stage of the trial could be carried out in one of two ways. The essential requirement is that neither the clinician nor the patient shall know whether the tablets are active or inert. Selection of the patients for the subgroups to be given active or inert tablets may be made at random or by design. It was felt that selection should be by design in order to keep the subgroups as evenly matched as possible. The opinions of pharmacologists and other research workers were sought on this question, and it was generally agreed that selection should be by design.

At the final stage of the trial the assessment differed in seven instances from that which would have been expected if the recorded improvement had been entirely due to the use of the new drug. Analysis of these cases is of interest. Of the five patients who were "no worse" on the inert tablets, four had been classed at clinical evaluation as "worth while" and one as "good." In common with the other patients in the subgroup given inert tablets these five were returned to treatment with B.S. 5930 at the end of the two-weeks period. The four "worth-while" patients showed no appreciable difference in their condition at the next follow-up clinic. The "good" patient, after returning to the active tablets, not only stated that she felt better but also showed some objective improvement. Examination of the forms and notes of these patients suggests that the unexpected association at the final stage was due to taking too much account of the subjective phenomena at the clinical evaluation level in the case of the four "worth-while" patients and at the final assessment in the other. Both the patients who were assessed as "worse," although they had received active tablets, had been classed as "good" at the clinical evaluation. It is now felt that they should have been classed as "worth-while."

Modification of the clinical evaluation in the light of the final stage of the trial gives: from the group who had responded to previous treatment: 15 excellent, 13 good, 5 worth while, and 17 not improved; from the group who had not responded to previous treatment: 1 excellent, 2 good, 3 worth-while, and 11 not improved.

Finally, at the risk of stating the obvious, we would like to make two personal comments. Firstly, we feel that this investigation emphasizes the need for close collaboration between the clinician and the scientist, and for careful experimental design to meet particular circumstances. Secondly, we believe that clinical evaluation is still of great importance in the trial of new drugs, and that, although highly important in these trials, statistical analysis is not a substitute for clinical experience.

Summary

A new compound, B.S. 5930, has been tried in the treatment of 67 patients suffering from Parkinsonism. A clinical improvement was noted in 39 cases. The results were considered to be good or excellent in 31 cases, or 46%.

A new method of carrying out clinical trials of this type is described and its advantages are discussed.

We would like to thank Professor A. M. Boyd for permission for one of us (A. H. R.) to take part in this investigation; all those who have given valuable and helpful criticism during the course of the investigation; and Dr. C. J. Van Boxtel, of Messrs. Brocades-Stheeman, for supplying the B.S. 5930 ("disipal") and inert tablets.

OPERATIVE TREATMENT OF VARICOCELE

BY

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For the treatment of varicocele Samuel Cooper, in 1828, advocated support with a suspensory bandage, the use of cold and alum lotions, and also that the blood be repeatedly taken away by means of leeches. He considered that radical cure could seldom be effected. In more recent years Everidge (1943) stated that, although the risks of operation for varicocele were almost negligible, the end-results often left much to be desired—an opinion which reflects the general feeling of dissatisfaction with the results of the operation as commonly practised to-day. Indeed, attention has been drawn to the inadvisability of operative treatment (Douglas, 1921; Campbell, 1928; Page, 1954).

The classical operation, in which a segment of the pampiniform plexus is excised between ligatures through an upper scrotal incision, has fallen into disrepute because of the common occurrence of post-operative complications. Tearing of thin-walled dilated veins often results in the formation of a haematoma, which may become infected, with consequent prolonged sepsis and delayed convalescence. Faulty estimation of the amount of venous plexus to be removed leads to the development of a hydrocele if too many veins are tied, whereas inadequate removal is followed by a recurrence of the varicocele. Because of the difficulty in identifying small arteries in the spermatic cord, the arterial blood supply of the testis may be damaged, with consequent testicular atrophy. "I think it is impossible to remove a varicocele of any size without damaging the spermatic artery" (Page, 1954).

In an attempt to avoid such complications, operations have been devised in which the spermatic veins are divided in the inguinal canal or at the internal inguinal ring. Such procedures are particularly applicable to cases in which there is a coincident inguinal hernia, but they still carry the risk of damage to the arterial blood supply and to the collateral venous return of the testis and epididymis.

The operation described in this paper is that of division of the spermatic veins, at a level 2 in. (5 cm.) above the internal inguinal ring, where the veins lie on the posterior abdominal wall. At this site impairment of testicular blood supply can be avoided.

Venous Drainage and Arterial Blood Supply of Testis and Epididymis

Venous Drainage.—The veins of the testis and epididymis form an anastomosing plexus—the pampiniform plexus—which lies in the spermatic cord. As the veins pass upwards to the internal inguinal ring they become reduced in number, and, on the posterior abdominal wall, form one or two veins which drain into the renal vein on the left side and into the inferior vena cava on the right side. In addition to this main route of drainage, secondary venous channels pass along the vas deferens to the internal iliac veins, and communications are present between the pampiniform plexus and the pudendal and circumflex systems of veins. The presence of these subsidiary routes of drainage has been confirmed in this unit by anatomical dissections and also by radiography after injection of diodone into the

pampiniform plexus. During the classical operation for varicocele the destruction of these anastomosing channels is responsible for some of its adverse results.

Arterial Blood Supply.—In the past different anatomical descriptions of the arterial blood supply of the testis and epididymis have given rise to confusion, but within recent years the position has been clarified by the work of Harrison (1949), who has demonstrated by arteriography the distribution of the vasal and cremasteric arteries and their anastomoses with the testicular artery. From his work it is apparent that in a number of cases division of the testicular artery alone might not impair nutrition of the testis, but in the classical operation for varicocele there is a considerable risk of damage not only to the testicular artery but also to the vasal and cremasteric vessels. Harrison has pointed out that the operative procedure is much safer if the testicular veins are ligated at a site where the testicular artery is large enough to be seen and avoided.

Operation

The operative procedure which has been used in this unit during the past three years is a modification of that described by Palomo (1949).

The operation is carried out under general anaesthesia. A 4-cm. incision is made 3 cm. above and parallel to the inguinal ligament, the midpoint of the incision being above the internal inguinal ring. The aponeurosis of the external oblique muscle is divided in the line of the incision, and the fibres of internal oblique and transversus muscles are separated as in a gridiron incision. Extraperitoneal fat and peritoneum are swept upwards and the testicular vessels exposed as they lie on the posterior abdominal wall, lateral to the external iliac artery, which serves as a useful guide. The vein or veins are isolated and divided between ligatures. The wound is closed in layers without drainage. The patient is allowed out of bed on the following day and is discharged home in four days. A scrotal support should be worn for one to two weeks after operation.

Post-Operative Course.—Following operation a marked diminution in the size of the varicocele occurs over a period of weeks, and eventually only residual thickening in the pampiniform plexus can be felt. The testis returns to a more normal level and the scrotum is no longer pendulous and relaxed.

Material

Thirty-five patients, all of whom were referred from the male subfertility clinic, have been submitted to operation. In five of these patients the varicocele was bilateral, thus making a total of 40 operations. The size of the varicocele varied considerably, in some cases being very large. In most of the patients there was associated softness of the testis. In the first 20 cases the Palomo technique of division of the testicular artery as well as of the veins was carried out, but in the light of Harrison's work on testicular arterial blood supply it was considered inadvisable to divide the testicular artery, damage to which may impair testicular nutrition if the collateral blood supply is inadequate. In the last 20 cases only the veins were divided.

Results

In one case no improvement occurred. This patient was submitted to a further operation, and it was found that the inferior epigastric veins had been divided instead of the spermatic veins. This error probably occurred because the incision had been carried too far medially.

In approximately one-third of the cases in this series slight oedema of the scrotum was noted for a few days. No other post-operative complications have occurred.

Despite the fact that the testicular artery, as well as the veins, was divided in the first 20 cases, there has been no case of testicular atrophy. The consistence of the testis has been noted to improve over a period of months.

The results of post-operative seminal analysis are reported in Mr. Selby Tulloch's article in this issue.

Summary

The unpopularity of the classical operation for varicocele is due to the high incidence of post-operative complications.

The operation of high division of the spermatic veins is described. This operation fulfils the obligation that any operation for varicocele should safeguard testicular arterial blood supply and preserve collateral venous return from the testis and epididymis.

The results of this operation in a series of 40 cases have proved very satisfactory.

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VARICOCELE IN SUBFERTILITY

RESULTS OF TREATMENT

BY

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During recent years considerable interest has been directed to the subject of fertility in the male. It is becoming more fully appreciated that in the barren marriage the male should be examined, and that such an examination should precede the examination of the female.

When a subfertile state is found, attention is focused on the aetiology and the treatment. Recognized aetiological factors are inflammatory conditions of the urethra, prostate, seminal vesicles, and epididymis; endocrine disturbances; the failure of testicular development; traumatic and other conditions. Much has been written about methods of treatment: vitamins, hormonal therapy, operative intervention for mechanical obstruction have all been recommended. These methods have their supporters and opponents, and there is considerable variation of opinion regarding the value of treatment.

During examination of subfertile males, and in some cases sterile males, it has been found that the incidence of varicocele is very high. The term "varicocele" may be defined as elongation, dilatation, and tortuosity of the veins of the pampiniform plexus. It was observed in the physical examination of males who had a varicocele—far more common on the left side than the right—that the testis was sometimes smaller than normal and showed evidence of softening in varying degree. Often the testis on the opposite side showed a tendency towards softening. In many cases seminal analysis of the male who had a varicocele demonstrated variation from moderate degrees of subfertility to gross depression of the quality of the seminal fluid, even in some cases to azoospermia.

Dr. J. K. Russell (1954), in a careful study of the relationship of varicocele to subfertility in the male, has no doubt that the incidence of varicocele is higher in men with poor-quality seminal fluid. He concludes: "The purpose of this paper is not to plead for more active treatment (indeed, attention has been drawn to the dangers of active surgical treatment), but rather to challenge the traditional attitude that varicocele is an innocuous condition and to stress the need for more

extensive investigation into the natural history of varicocele and the effect which it may have upon fertility."

It has been stated by such an authoritative worker in the field of subfertility as Hotchkiss (1944) that "the surgical correction of a varicocele is probably only effective as a prophylactic measure against damage which might ensue with passing years. It is unlikely that the operation has other than cosmetic value in long-standing cases with small soft testes." The purpose of this communication is to stress the value of operative intervention, provided the correct operative technique is used.

It was considered that venous stasis could have two effects on the germinal epithelium:

(a) Lack of Nutrition of the Germinal Epithelium.—Because of venous stasis and congestion it seemed possible that the germinal epithelium was not receiving adequate nutrition and oxygenation. It is well known that upsets of nutrition to tissue can occur in other sites of the body where varicose veins commonly occur.

(b) Upset of Temperature Balance.—For adequate maturation of spermatozoa a very delicate temperature balance in the scrotum must be maintained. Is it likely that with venous stasis temperature balance is upset? From a nutritional point of view it is hard to explain how a male with unilateral varicocele would not produce an adequate specimen of seminal fluid from the other testis, and it seems more than likely that the cause is an upset of temperature. Davidson (1954) believes this to be the reason.

Illustrative Case

Some years ago a male aged 27 reported for examination. On two occasions seminal examination confirmed azoospermia to be present. Physical examination showed that there was bilateral varicocele, with testes slightly smaller than normal and of soft consistence. Testicular biopsy proved of interest. The primary germ cells—the spermatogonia—were present. The lumina of the seminiferous tubules were filled with considerable cell debris, and spermatozoa were not present anywhere in the section (Fig. 1). In view of these findings, it was decided to carry out radical cure of the varicocele. Within three months of operation spermatozoa were found in the seminal fluid. Within nine months this patient's wife had become pregnant. The sperm count was 27,000,000 per ml. Pregnancy terminated normally. By the simple cure of a bilateral varicocele a state of azoospermia had been reversed and a normal pregnancy had taken place.

FIG. 1.—Testicular biopsy prior to operation for varicocele. Note failure of normal spermatogenesis.

FIG. 2.—Biopsy from same testis as in Fig. 1 after radical cure of varicocele. Note return to normal spermatogenesis.

This patient was most co-operative, and after the pregnancy he allowed a further testicular biopsy. This was taken from the same testicle as the original biopsy. It was seen, by comparison of the two sections, that the germinal pattern of the spermatogenesis in the seminiferous tubules had returned to normal (Fig. 2).

This successful result stimulated interest in the treatment of varicocele in the subfertile male. Unfortunately, only a small proportion of patients agree to operative intervention.

Operation

The operation recommended is direct ligation of the spermatic vessels as described by Mr. W. A. T. Robb at p. 355. With this operation there are no dangers of testicular atrophy. The results of treatment are classified into three groups (see Table).

Results of Treatment

Case	Age	Years Married	Unilateral or Bilateral Varicocele	Highest Sperm Count		Time After Operation of Initiation of Pregnancy
				Pre-Op.	Post-Op.	
				Group 1		
1	28	2	B	Azoospermia	27,000,000	9 months
2	29	3	U	,,	29,500,000	4 ,,
3	30	9	U	3,500,000	66,000,000	4 ,,
4	25	2	U	1,300,000	43,000,000	4 ,,
5	32	4	U	3,500,000	97,000,000	8 ,,
6	27	3	U	1,000,000	29,000,000	9 ,,
7	33	3	U	8,000,000	52,000,000	15 ,,
8	29	4	U	20,000,000	29,000,000	5 ,,
9	30	5	U	25,000,000	43,000,000	25 ,,
10	27	6	B	11,400,000	12,000,000	5 ,,
				Group 2		
11	28	4	B	1,450,000	85,000,000	
12	27	2	U	15,000,000	89,000,000	
13	31	9	U	15,000,000	74,000,000	
14	23	3	U	12,000,000	44,000,000	
15	28	3	U	55,000,000 20% (poor motility)	80,000,000 25% (poor motility)	
16	32	9	U	28,000,000	44,000,000	
17	33	4	U	2,000,000	18,500,000	
18	29	5	U	1,500,000	13,000,000	
19	28	3	U	23,000,000	32,500,000	
20	27	4	U	50,000	8,000,000	
				Group 3		
21	29	8	U	19,000,000	23,000,000	
22	26	3½	U	3,200,000	5,000,000	
23	29	4	U	6,000,000	7,000,000	
24	34	9	U	185,000	690,000	
25	28	3	U	Azoospermia	80,000	
26	28	2	B	,,	40,000	
27	37	4	B	8,500,000	2,250,000	
28	22	2	U	Azoospermia	Azoospermia	
29	36	7	U	,,	,,	
30	26	3	U	,,	,,	

Group 1. Return to Normal Fertility with Successful Pregnancy.—In this group are two patients who reported with azoospermia and whose wives became pregnant. In some cases there is no doubt that with the considerable improvement in the sperm count a pregnancy has occurred. In one patient (Case 10) there was practically no improvement in the count. This man had been married for six years and a pregnancy was initiated within four months of the operation.

Group 2. Considerable Improvement in Sperm Count.—This group includes patients whose sperm count has shown significant improvement, but pregnancy has not yet occurred. The most striking result is in Case 11; but, unfortunately, this man's wife refuses to be examined. With a sperm count as that in Case 15 operation would not normally be considered, but the motility rate after repeated examinations was 20%. Even with an improvement of count the motility rate was 25%. It is hoped that many patients in this group may yet initiate a pregnancy.

Group 3. Failure.—Although in this series there are two reversals from sterility to subfertility, the group must generally be regarded as failures. In some patients the poor sperm count has even deteriorated. It may be that the process of destruction of the germinal epithelium had caused so much damage that it was not reversible.

Summary

A group of subfertile patients with associated varicocele is discussed.

The operation used in all patients was high ligation of the main spermatic vessels. This operation is simple, effective, and without danger to the testicle.

The number of cases presented is small, but it is some years since the first operation was done, and to collect a large series is a slow procedure.

From the results obtained it seems justifiable that where a varicocele is associated with subfertility the varicocele should be cured.

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FOETAL DISTRESS AND INTRA-PARTUM FOETAL DEATH

BY

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The loss of the child during labour is particularly tragic to the mother, when she has carried and nourished her baby for so many months; the prevention of such tragedies must depend on the successful anticipation of any threat and on proper and timely aid. The signs of distress of the baby *in utero* are derived from the foetal heart sounds and from the reaction of the gut to anoxia. It is the purpose of this investigation to examine the problem from a clinical point of view, and to this end 206 cases of foetal distress extracted from 3,168 deliveries (an incidence of 6.5%) have been analysed. A section of these cases (1,833 deliveries with 128 cases of distress) were specially investigated with regard to predisposing factors.

Von Winckel (1903) stated that a foetal heart rate above 160 or below 100 a minute should be regarded as a sign of distress, and this is still generally taught in this country. Stander (1941) accepts the same criteria, but Lund (1940) has suggested that foetal tachycardia is of little or no significance. In a later study Lund (1943) followed the foetal heart through labour in 250 women and found a transient tachycardia in 17.6% and persistent tachycardia in 5.6%. He was unable to find any relation between this and the stillbirths, neonatal deaths, and asphyxias on delivery. Canon *et al.* (1952), in a more extensive and detailed investigation, support these views.

The general impression gained from the literature is, firstly, its scarcity considering the importance of the subject, and, secondly, the extreme vagueness and lack of guidance from the clinical point of view.

Criteria of Distress

(1) Slowing of the heart rate to 100 a minute or less as proposed by Von Winckel will result in a high proportion of severe distress in the cases so selected; it will also result in the detection of many cases at too late a stage for effective action. In the present series, cases showing a fall in rate to 110 or less were included, but, within the series so obtained, note has been taken of rates below 120 where the rate has been steadily in the region of 140 at the start of labour.

(2) Rise in heart rate to 160 a minute or more has been accepted for inclusion in this series. As has been pointed out earlier, Lund and others would disagree with this criterion, which is that originally suggested by Von Winckel and accepted still by such authorities as Stander (1941) and Baird (1950). In this series, moreover, rates of 150, where the rate has been previously steady in the region of 140, are regarded as worthy of note.

(3) Arrhythmias are of two types: (*a*) irregularities of rhythm of a rapidly varying kind; and (*b*) wide swings in rate, with a given rate maintained over several minutes at a time. All such cases have been included in the present series.

(4) Variation of rate with uterine contractions should constitute a most valuable and early sign, but it is difficult to obtain satisfactory observations from the busy midwife, and she is mainly responsible for making the necessary records. For this reason it has not been possible to use the sign in this series.

(5) The passage of meconium in vertex presentations occurs in two degrees of severity, recognized clinically by the terms "meconium staining" and "frank meconium" in the liquor amnii. In the former the liquor is a greenish or greenish-yellow colour owing to the passage of small quantities of meconium over a relatively long period of time. If frank meconium is present a considerable quantity has been passed in a short space of time into the liquor amnii, and this finding would be generally accepted as of serious significance. Many would regard meconium staining of the liquor as scarcely worthy of note, but all such cases have been included in this series, and its significance is discussed later.

Routine for Detection of Distress

The following points are stressed in the detection of these signs of distress during labour.

(1) All cases with meconium in the liquor amnii in cephalic presentations, even if staining only is present, should be reported promptly to the medical staff, and thereafter the foetal heart rate should be charted graphically.

(2) The foetal heart sounds should not be noted merely as "F.H.H." or "foetal heart heard," as is a common practice, but the rate should always be counted at each observation. If this is done it will also ensure that the sounds are auscultated for long enough for arrhythmias to be noticed. Special care—that is, a foetal heart chart and more frequent auscultation—should be instituted where the rate rises to 160 or drops to 120 a minute. Where the rate has been steady between 140 and 150, as is often the case, then a consistent rise above 150 or a fall below 130 should lead to increased vigilance.

(3) Where there is reason to expect distress owing to the presence of predisposing factors (see below) the heart rate should be plotted on a graph chart so that trends are made obvious to the obstetrician who is visiting the case intermittently or for the first time. The blood pressure and albumin record form as used in University College Hospital has been found very satisfactory for this chart. In the normal case the rate is noted at hourly intervals in the first stage, and at quarter-hourly intervals in the second stage; in the suspect case these intervals will be shortened.

(4) The preceding suggestions represent minimal requirements; it may be possible for the alert midwife to chart the response of the heart to contractions as a routine, instead of as an occasional observation. This needs time and judgment, and might best be done by a continuously recording cardiograph.

Predisposing Factors

The effect of maternal age, parity, toxaemia, ante-partum bleeding, and maturity has been examined in 128 cases extracted from 1,833 consecutive deliveries.

Maternal Age.—Cases were grouped into those over 30 and those under 30 years of age. In the older group an incidence of distress of 8% was found as compared with 6.5% in the younger women; the difference is not statistically significant.

Parity.—There is a statistically significant difference between primigravidae and multigravidae, the former showing 8.9% and the latter 4.6% of distress. It is thought that this may be due to the increased soft-tissue pressure on the foetal head, and also to the greater uterine tone normally present in the primigravidae.

Ante-partum Bleeding.—This group includes all cases of uterine bleeding prior to the onset of labour, where the child was alive at the start of labour. It therefore excludes all cases of severe accidental haemorrhage and includes a large majority of cases of bleeding of the threatened abortion variety. It seemed likely that there might be some degree of placental infarction or other damage in these cases, predisposing to foetal anoxaemia. There was an incidence of 13.1% distress in this type of case, as compared with 6.1% where there was no such bleeding, and this is statistically significant.

Toxaemia.—The standard for this has been a blood pressure of 150/100 or more with or without albuminuria. Toxaemic cases show an incidence of 8.4% compared with 6.7% in the non-toxaemic group, which is not statistically significant. It is surprising that this difference is not more pronounced, and it is probable that certain favourable factors are tending to cloak the toxaemic effect.

Maturity.—Two groups were collected on a basis of the expected date of delivery; those occurring 14 or more days before this being designated "premature," and those 14 or more days after that date being designated "post-mature." An incidence of distress in the post-mature group of 13.4%, as compared with 8.4% in the premature and the overall incidence of 6.5%, is statistically significant. This is in agreement with the findings of McKiddie (1949) and of Clayton (1953).

Signs and Sequences

The five main signs of distress have been investigated for their individual significance, and also for their significance in certain sequences. Where the condition of the child at delivery had been noted as stillborn, poor, or fair only, the child is classified as "affected"—that is, adversely—and where the condition was described as good the child is classified as "not affected."

It was found that when meconium staining was noted 44% of the babies were affected; with frank meconium the corresponding figure was 69%; with a raised heart rate (160 a minute or more), 62%; and with a slowed rate (120 a minute or less), 56%. With irregular rhythm 59% were affected.

There were 10 cases in which slowing of the foetal heart followed an initial rise, and 13 in which a rise followed slowing; this does not support the widespread impression that the first of these sequences is very frequent or more "typical" of distress than the other combination. The rise followed by fall in rate had a 44% incidence of affected infants; the reverse sequence seemed more serious with 60% affected.

Analysis of Stillbirths in Labour

There were 45 cases of foetal death in labour, this being 37% of all stillbirths in this period; this is a surprisingly large proportion of the total stillbirths and indicates an important field for salvage. Where signs of distress had been properly looked for, only 3 cases out of 26 suffered foetal death without warning. Of 19 deaths *in utero* thought to have shown no warning, none had been watched with the standard of care which is regarded as desirable.

The stillbirths were attributed to accidental haemorrhage (3 cases), toxaemia (3), congenital anomalies (10), breech delivery (4), difficult forceps (1), prematurity (3), placenta praevia (1), umbilical cord complications (11), and "not known" (9). The frequency of cord complications and the group not known are of especial interest, while the incidence of congenital anomalies is to be expected and must be constantly borne in mind.

It was found that the foetal deaths were roughly equally distributed between the first and second stages of labour, with 21 deaths in the first stage and 24 in the second stage.

Umbilical Cord Complications

The frequency of cord complications in the group of stillbirths in labour has just been mentioned; in this series of foetal distress cases there were 58 cord complications, giving an incidence of 28%, and in 54 of these there was no other obvious cause of distress.

Of these 58 cases, there were one or more turns around the neck in 47 cases, true knots in 5, prolapsed cord in 7, and a short cord in 4. In these 58 cases there was a foetal loss of 9 stillbirths and 1 neonatal death.

There is an interesting report by Clemetson (1953) of estimation of the oxygen content of cord vein and artery blood; his results show clearly how seriously foetal oxygenation can be affected by "cord around the neck." The otherwise healthy foetus with no additional adverse factors may survive, but if this effect is added to a pre-existing anoxia the result may well be lethal.

Treatment

Assessment of the effects of treatment is difficult without a control series; in many respects those cases which received no treatment apart from possible episiotomy do offer a control, if it be remembered there will be a loading of the more severe cases in the treated group. It must also be emphasized that a factor of the greatest importance is the timing of intervention, which is as important as the mode of treatment itself. Thus it is considered that two of the stillbirths from caesarean section could have been saved if the same action had been taken somewhat earlier. It should also be recognized that the fact that a child cries vigorously at birth is no guarantee that it has not been in danger, since, provided that the anoxia is not too extreme, the initial effect may be stimulant.

Analysis of methods of treatment shows that a policy of non-intervention—that is, normal delivery with or without episiotomy—is associated with an incidence of 25% stillbirths, whilst in the group delivered by forceps or caesarean section, in spite of loading of this group with the more severe cases, the stillbirth incidence is reduced to 13%.

An even more emphatic presentation of these facts is given by examination of a group of elderly primigravidae, there being 43 such cases in 206 cases of foetal distress. As might be expected, active intervention was practised more frequently and with less delay than in other cases. In 12 cases of non-intervention there were 3 stillbirths—that is, 25%; in 31 cases of forceps or caesarean delivery there was 1 stillbirth, an incidence of 3%.

Waters and Harris (1931) were the first to point out the beneficial effects of inhalation of high concentrations of oxygen by the mother. The experience gained in this series suggests that, though in some cases the oxygen may enable the baby to survive until delivery, in others it may only delay the tragedy, as the temporary improvement obtained may lead to postponement of action until too late. This occurred in one of the stillbirths lost at caesarean section (Fig. 1). It is felt that it is better to regard the use of oxygen in well-marked distress as a means to ward off disaster while preparations for immediate delivery are made.

In this series it has thus been shown that a considerable improvement was obtained in the foetal salvage where active intervention was judiciously practised.

It seems likely that results can be further improved (*a*) by even more methodical vigilance; and (*b*) by improvement in the timing of intervention; thus there was a loss of 6

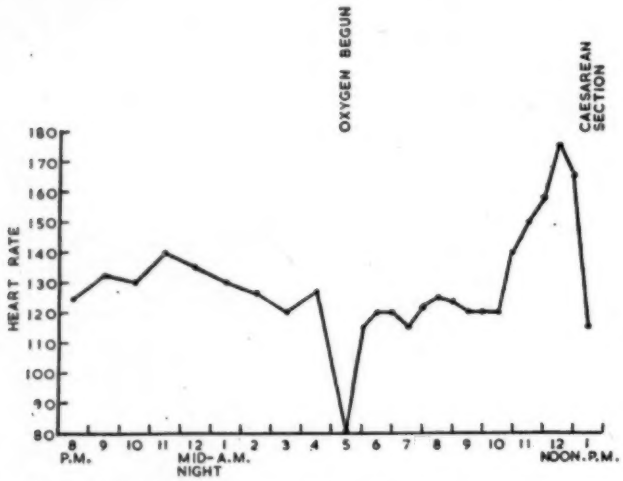

FIG. 1.—Foetal heart chart. Primigravida aged 41. Temporary oxygen effect. Stillbirth.

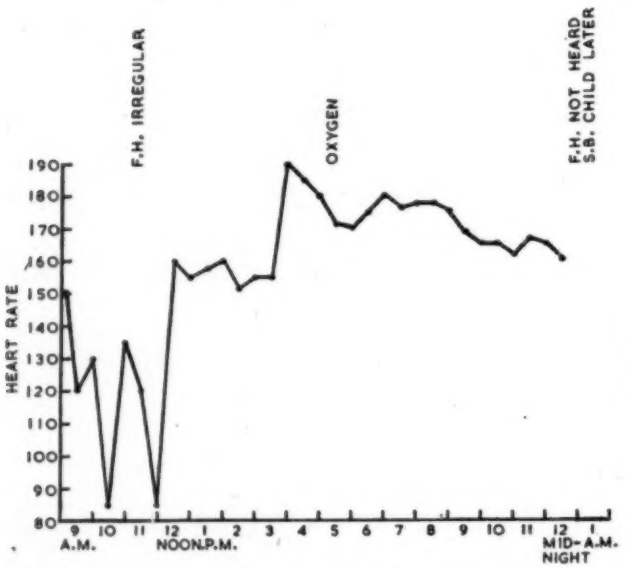

FIG. 2.—Foetal heart chart. Normal primigravida aged 22. Distress after 15 hours in labour. Stillborn child: no gross congenital anomalies.

babies in 67 forceps deliveries, of which 2 infants might have been saved by earlier action. Of 31 caesarean sections for distress, 3 babies were lost; reviewing these, it is thought that earlier operation would have saved 2 of these stillbirths.

Discussion

Cases of foetal distress present some of the most difficult clinical problems because of the variability of the physical signs and of the limited information available. To adopt the view that, since accurate assessment and prognosis is not at present possible, conservative measures should be adopted is not borne out by the present series, which strongly support the value of timely intervention (Figs. 3 and 4). In the present state of knowledge one is faced with the necessity of being prepared to act on the basis of probabilities, or of accepting a quota of avoidable foetal deaths or damaged children.

There is great need of the valuable additional information which might be supplied by continuous recording foetal phonocardiography or electrocardiography, with particular reference to the effect of the uterine contractions; a study of rates and rhythms over the whole or long periods of labour should be carried out.

In addition to the physical signs observed, decisions on treatment will be based on every possible relevant factor such as age, infertility, and so on.

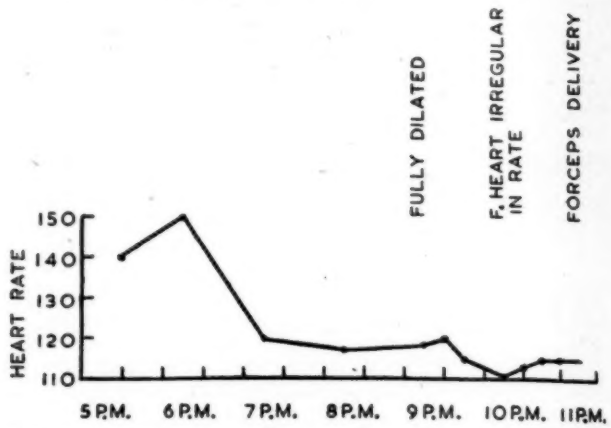

FIG. 3.—Normal primigravida aged 23. Foetal heart regular at about 140 prior to events in this chart. Forceps delivery for transverse arrest was not difficult, but was too late. Stillbirth.

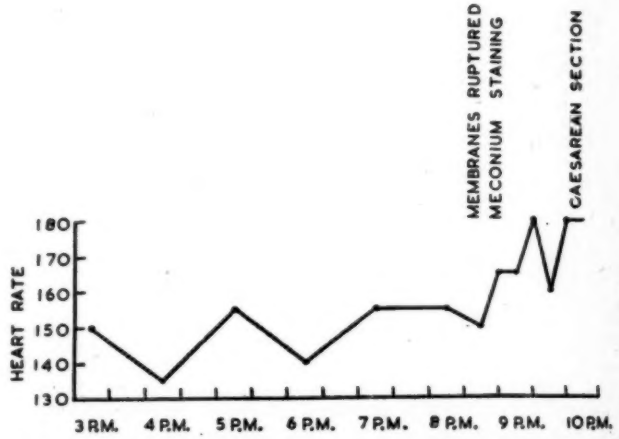

FIG. 4.—Foetal heart chart. Same patient whose first labour is shown in Fig. 3. Living child in good condition delivered by caesarean section. (The onset of signs of distress immediately after rupture of the membranes is not infrequent.)

Summary

Foetal distress and its associated problem of foetal death in labour have been investigated from the clinical point of view.

206 cases of foetal distress extracted from 3,168 hospital deliveries were detected during the routine care of patients by the midwifery staff, without special instruments or training.

Possible predisposing causes of age, parity, toxaemia, maturity, and ante-partum bleeding are subjected to statistical examination.

The signs of foetal distress during labour are analysed for their individual significance and for their significance when they occur in certain sequences.

Treatment and its results are described and discussed; the advantages of active intervention in many cases is suggested.

Suggestions are made regarding possible lines along which progress might be made towards more rapid and accurate diagnosis with a resultant improvement in treatment and results.

As has been pointed out in the text, the bulk of the routine observations are the work of the midwifery staff, past and present, to whom we express our appreciation and thanks. Dr. A. S. Simpson, divisional medical officer for Ashton-under-Lyne, has been responsible for the statistical analyses, for which we are most grateful, and Dr. Ruth FitzGerald has been of the greatest help in the preparation and revision of the text.

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LEFT ATRIAL TUMOUR SIMULATING MITRAL STENOSIS

BY

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AND

D. G. JULIAN, M.A., M.D., M.R.C.P.

Primary cardiac tumours are quite uncommon, but are now being reported with increasing frequency. On occasion surgical removal may be possible when mechanical obstruction occurs, but pre-operative diagnosis is difficult and is usually reached only at exploratory cardiotomy. The case here described manifested some of the features of rheumatic mitral stenosis, but valvular disease was not detected at operation. The diagnosis of a localized cardiac tumour, usually a myxoma, producing obstruction is now more than of academic interest, and similar cases may be encountered from time to time in thoracic surgical units, where cardiotomy is now a routine procedure. Anomalous signs such as were found in this case may enable a pre-operative diagnosis to be made and so facilitate radical removal in a planned operation.

Case Report

A woman of 48 was first seen in April, 1953, when she complained of gradually progressive dyspnoea of five months' duration. She had previously been healthy, having had two uneventful pregnancies, and gave no history of rheumatic infection. She had noticed increasing pallor and had a little cough with occasional slight haemoptyses. Exertional dyspnoea was severe, with considerable orthopnoea, and several attacks suggestive of acute paroxysmal dyspnoea had occurred. Fatigue was also a prominent symptom. Apart from a vague constant left submammary ache, true cardiac ischaemic pain had occurred often. There had been no syncopal attacks and no embolic accidents.

She was a frail pallid woman, showing no cyanosis, jugular engorgement, or peripheral oedema. The heart rhythm was regular and the blood pressure 120/80. The apex beat was tapping in quality with a slight thrust, and there was a pronounced left parasternal heave. The mitral first sound was accentuated and a late mitral diastolic murmur (grade 2) was audible. This varied a little with posture, being best heard in the left lateral position after exercise. No apical systolic murmur was heard. The basal second sound was loud, but no basal diastolic murmur or clear opening snap was audible. Apart from a few coarse moist sounds over the chest, the rest of the physical examination was negative.

Cardioscopy revealed considerable enlargement of the right ventricle with little or no atrial enlargement and no visible calcification. The lung fields showed evidence of severe pulmonary hypertension, with large pulmonary arteries, peripheral vascular attenuation, and prominent basal lines B of Kerley. The radiologist (Dr. E. L. Rubin) was of the opinion that the radiological appearances were unlike those of true mitral stenosis.

Cardiac catheterization was undertaken, and the mean pulmonary artery pressure was 80 mm. Hg, and the pulmonary capillary pressure 44 mm. Hg. There was no evidence of intracardiac shunt. The electrocardiogram showed right ventricular hypertrophy pattern in the unipolar chest leads.

With some reservations, owing to the several anomalous features of the case, the patient was submitted to cardiotomy. This was undertaken by Mr. Ronald Edwards on January 5, 1954, when a pedunculated tumour was palpated in the left atrium, arising from the septum. This was acting in the manner of a ball-valve, plunging into the mitral orifice with each auricular systole. The tumour was friable and, in view of the danger of embolism, removal could not be undertaken; the chest was therefore closed. A more radical operation was to be attempted later under hypothermic anaesthesia, but the patient died of acute pulmonary oedema on the second post-operative day.

Necropsy.—Both lungs were oedematous, with some discrete areas of consolidation. On section the alveolar walls were thickened and the pulmonary vessels hypertrophied. Pigment-containing macrophages were present in many of the alveoli. An infarct, presumed to be a few days old, was present in the left kidney. The left thyroid lobe contained a small colloid adenoma. The right ventricle of the heart was hypertrophied and dilated, the wall being 7 mm. in thickness. The left atrium was almost completely filled with a tumour, 16 by 40 by 25 mm. in size, which was adherent to the atrial wall at the site of the

Drawing of the heart, displaying the atrial tumour entering the left ventricular cavity through the mitral orifice.

foramen ovale by a pedicle 15 mm. in diameter. The tumour projected longitudinally towards the mitral valve and the tip protruded through the valve orifice for 10 mm. The tumour was brownish in colour and resembled in many ways an ante-mortem thrombus, but also contained areas suggestive of myxomatous change. The mitral and other valves were normal.

Histology.—The tumour consisted largely of a rather structureless fibrillary basophilic material, having a mucinous appearance, in which were scattered groups and cords of rather rounded cells with eosinophilic cytoplasm. There were numerous blood-filled spaces present, many of which were lined by flattened endothelium-like cells, giving the growth in places an angiomatous appearance. A considerable amount of iron pigment was scattered throughout the tumour, particularly near its attachment. It did not invade the endothelium, but was attached to it along its surface, and in places faded imperceptibly into it. The appearances were those of the so-called pseudomyxoma of the heart.

Discussion

The benign myxoma is the commonest primary cardiac tumour, and is thought to rise from thrombosis in the atrium. Structurally it resembles the mass thrombus associated with mitral stenosis (Evans and Benson, 1948), but it may occur in the absence of valvular obstruction as in this case, and the actual mechanism of production is unknown. The site of attachment may be on either side of the atrial septum and almost invariably at the foramen ovale. When on the right side, the signs resemble those of superior vena caval obstruction, as in the case of Macoun (1949), and the clinical picture of mitral stenosis may be simulated when the tumour arises from the left side of the septum (Jensen, 1934; Bien and Ch'in, 1936; Hamilton-Paterson and Castleden, 1942; Thompson, 1944; Burnett and Davidson, 1945; Nanson and Milnes Walker, 1952).

The following points have been stressed by writers concerned with the diagnosis of this condition:

Short History of Symptoms, Followed by Inexorable Downward Progress and Failure to Respond Adequately to the Usual Lines of Treatment.—Symptoms had lasted only six weeks in one case (Houck and Bennett, 1930), two months in another (Allison and Susman, 1949), and twelve months in another (Fawcett and Ward, 1939). The tumour is presumably symptomless until it begins to engage in the A–V orifice, obstruction rapidly becoming severe, owing to the driving down of the tumour between the mitral cusps.

Pain.—This has been mentioned as a feature in most of the case histories described, both the common type of submammary ache and the less commonly encountered true anginal pain. But this symptom is relatively so common in rheumatic mitral disease that it can be of little diagnostic value.

Postural Fainting and Postural Dyspnoea.—Sudden syncopal attacks have often been referred to in case reports, but they have not occurred in all cases. Suspicion would be aroused, however, if postural fainting were a dominant symptom.

Murmurs Varying with Posture.—Several cases are reported to have shown this phenomenon, but it is such a common finding in ordinary mitral stenosis that little significance can be attached to it.

It would seem that a short history of symptoms, and fairly rapid deterioration, combined with absence of the classical radiological appearances of mitral stenosis, are the only helpful indications of the presence of a left atrial tumour.

Our thanks are due to Dr. W. Sutton and Dr. Ronald Ellis, to Mr. Ronald Edwards, and to Miss Duckworth for the drawing.

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Medical Memoranda

Perforation of Intestinal Tuberculous Ulcer

Perforation of a tuberculous intestinal ulcer is thought to be very rare. The report of a case by Douglas (1953) has stimulated me to add the following case to the few already recorded.

Case Report

A man aged 25 was brought to me with a history of diffuse abdominal pain of four days' duration. The pain had started around the umbilicus and had then become diffuse. It had not increased in severity since it started. The patient had vomited several times on the first day. On examination he looked emaciated, with pale conjunctivae, and had a toxic appearance, a dry furred tongue, and oedema of both feet. His pulse was 125 and of poor volume. His abdomen was moderately distended, and there was a generalized tenderness, especially marked in the right iliac fossa. The abdomen was rigid, particularly in the right iliac fossa and on the right side. On screening the abdomen a large quantity of gas was noted under the right leaflet of the diaphragm. A perforation was diagnosed. It was labelled "? duodenal ulcer perforation, ? an ambulant typhoid with intestinal perforation" (such perforations being very common in India).

Operation.—On opening the abdomen thin watery and slightly purulent fluid welled out. A duodenal perforation was searched for and excluded. The distal part of the small gut was carefully examined and in its distal 2–3 feet (60–90 cm.) many peritoneal tubercles were found in groups, and one of the groups showed a tiny perforation. The perforation was closed in the usual way.

Comment

Although perforation of a tuberculous ulcer of the small intestine is thought to be very rare, Brown and Sampson (1926) say that it is not so very uncommon. They estimate the frequency of such perforations at 3.7%.

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Pectus Excavatum

The term "pectus excavatum" describes the funnel-shaped depression of the front of the chest caused by backward displacement of the lower sternum. In the past various aetiological factors were thought to be the cause of the deformity, but it is now attributed to congenital shortening of the anterior part of the diaphragm (Brodkin, 1949), the deformity becoming apparent as growth proceeds. If severe it may cause secondary mechanical effects on the respiratory and cardiovascular systems, but these are generally mild and most patients are free from organic symptoms. By contrast, functional disturbances often give rise to symptoms (*British Medical Journal*, 1952), and attempts to preclude them by operative correction of the deformity in childhood have been advocated in America by Dorner (1950), Lester (1950), and others, and have recently been reported in Great Britain by Chin and Adler (1954). In the following case the diagnosis of pectus excavatum was followed by the prolonged incapacitation of a symptomless patient.

Case Report

At a routine medical examination a symptomless schoolboy aged 12 was found to have a cardiac murmur and pectus excavatum. His family doctor confirmed these findings and referred him to a cardiologist, who believed the murmur was not of organic significance, but on detecting albuminuria he referred him for investigation to a general hospital, where a chest radiograph suggested tuberculosis, and he was

therefore transferred to a sanatorium. Soon after arrival he developed fits, and because albuminuria persisted he was referred to another hospital, where, the mother alleges, she was told at an out-patient consultation that the boy was suffering from two serious diseases, and she was advised to put him to bed at home and wait for him to die. He returned home to bed, where he remained 12 years, was cared for and educated by his family, and grew from a symptomless boy into an anxious adult. Twelve years later he got up because the family doctor suggested that a change of routine could not result in a worse outcome than was previously forecast. For 10 years he worked as a clerk, without illness, until the age of 34, when fits recurred, and for the investigation of these a new doctor referred him to another hospital, where he appeared in outspoken fear of a further period of prolonged rest. From his description the fits suggested attacks of petit mal, and on clinical examination an apical systolic murmur and pectus excavatum were noted, the latter being very severe. It measured 7.5 cm. in depth and had a capacity of 530 ml. The lungs were normal on clinical and radiological examination and there was no albuminuria.

It was thought that no organic disability existed, but on account of the patient's anxiety and the unusual story he related full investigation was recommended to reassure him about his health. By full cardio-respiratory investigation it was shown that both pulmonary and cardiac function were adequate and normal. Electroencephalography confirmed the occurrence of petit mal, and renal and urine investigations revealed normal kidney function with orthostatic albuminuria. A search for old case reports disclosed that, when tuberculosis was suspected at one hospital, a negative reaction to a tuberculin skin sensitivity test had been found elsewhere.

COMMENT

This case illustrates an unfortunate sequel to an alleged erroneous prognosis, and the usefulness of modern investigations in restoring confidence and eradicating the fear engendered in a symptomless patient 20 years earlier.

I am grateful to Dr. Neville Oswald for permission to report this case.

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The Relief of Recurrent Pancreatitis

Recently a number of papers and letters on this topic have appeared in various British journals. Holt (1954) lists ten different operative procedures applicable to the treatment of recurrent pancreatitis and gives 14 references, but nowhere does he refer to choledochojejunostomy-en-Y or to publications by Bowers and Greenfield on the subject. The operation of choledochoduodenostomy which Holt mentions is attended by grave disadvantages, notably the risk of cholangitis. Cattell and Warren (1953) in their book on surgery of the pancreas deal at length with recurrent pancreatitis, but although they include Bowers's papers among their references they do not mention the operation he advocates.

CHOLEDOCHOJEJUNOSTOMY-EN-Y

The operation of choledochojejunostomy-en-Y consists in division of the lower end of the common bile duct, closure of the distal stump, and anastomosis of the upper end of the duct to the end or side of a long side-limb of jejunum. This procedure is usually not difficult and does not give rise to shock, but it does demand a neat and careful technique. For operative details the reader is referred to papers by Bowers (1951), Bowers and Greenfield (1951), and myself (Barclay, 1950), and also to a more recent publication by Bowers (1954). Personally I do not always use an indwelling tube, and if I do I remove it early. I prefer two layers of sutures, one largely in surrounding fibrous and fatty tissues.

This operation ensures that all bile is diverted away from the ampullary region. In my experience of five patients, the first of whom was operated upon in 1948, it has given complete relief of pain, the major and disabling symptom in recurrent pancreatitis. It has also completely relieved pain in a patient in whom cholecystjejunostomy without duct division had been performed with only partial relief.

There is evidence from my small series that in some instances pancreatic function continues satisfactorily, although in one case the pancreatic condition undoubtedly progressed, as both mild symptoms of pancreatic insufficiency and diabetes developed in the first two years after operation. Nevertheless, until he was admitted to hospital for stabilization of his diabetes the patient had not been absent from work or realized he was unwell. In no case has there been a repetition of the pain, nor any illness even resembling acute pancreatitis. Some of these patients had had repeated severe attacks of pain before operation.

The operation at least leaves the pancreas to go its own way, and there is no evidence that this is dangerous. If the organ does eventually atrophy, the longer the patient has the benefit of internal and external pancreatic secretions the better. The obvious risks—stricture of the choledochojejunal anastomosis and cholangitis—have not apparently troubled the patients treated by Bowers and Greenfield. Extensive experience with choledochojejunostomy for bile-duct lesions and carcinoma of the ampulla gives little reason to fear duct stricture. In one of my patients in whom jaundice developed five years after operation I removed multiple stones from the common duct and repaired a moderate degree of stenosis of the anastomosis. In this case gross biliary infection had existed before the duct was transplanted.

The risk of stricture in the hands of a careful surgeon should not be great enough to deter him from using this operation. The danger of cholangitis is a myth, as was shown by Peterson and Cole (1948) and by Cole, Reynolds, and Ireneus (1948), so long as the jejunal limb is made at least 18 inches (45.7 cm.) long. Theoretically, peptic ulcer might be a late complication. If this does occur, partial gastrectomy should give satisfactory results.

Here, then, is an operation which removes no functioning organ, gives prompt and adequate relief of symptoms, is neither unduly difficult nor dangerous, and so far (six years) seems not to give rise to late problems. Its use does not preclude later pancreatectomy, but simplifies it. Choledochojejunostomy-en-Y seems therefore to be the logical operative treatment for patients suffering from recurrent pancreatitis. It is of course reasonable, where there is gross calculous, gall-bladder, or common-duct disease, to perform cholecystectomy and duct drainage as a first step. If, however, attacks continue, I believe that transplanting the bile duct into the jejunum is infinitely the best procedure available. All five of my patients are now well. The only complication which arose has already been referred to.

A case successfully treated by transplanting the duct after cholecystectomy had failed to relieve the patient's symptoms is described below.

A SUCCESSFUL CASE

A man of 56 was admitted to hospital on September 19, 1946, with a history since 1916 of attacks of upper abdominal pain going through to the back, becoming progressively more frequent, more severe, and of longer duration. The usual onset was soon after eating. There was a marked feeling of distension with the pain; relief by vomiting was temporary and constipation was usual. About eight hours before his admission he had sudden very severe pain with nausea. He had elsewhere undergone cholecystectomy, performed by a very capable surgeon, some eight months previously, the gall-bladder containing stones. The attacks were not relieved at all by this operation. He had never been jaundiced. For three weeks before admission he had suffered bouts of pain almost every day, and the previous

evening had taken a dose of sodium sulphate for constipation, which he associated with the pains. On admission the patient was severely shocked and in great pain. The diagnosis was acute pancreatitis, perforation to be excluded.

At operation there was a large quantity of beef-juice fluid in the abdomen; the pancreas was swollen and firm, with much oedema of the loose tissues over it. A drain was placed in the lesser sac and the abdomen closed. Convalescence was stormy, chiefly owing to the development of ileus and acute renal failure. On the seventh day the patient seemed dangerously ill with oliguria, drowsiness, hiccup, poor general condition, and a total non-protein nitrogen level of 150 mg. per 100 ml. blood. However, on the tenth day the urinary output increased and he improved. He was discharged on October 28, 1946.

He was readmitted on September 17, 1948, just two years later. He had been having attacks of severe pain about once a month, with more frequent minor episodes. Diet and laxatives gave no relief. He could not take any fatty foods. Saline aperients produced pain, so for the past nine months he had been using an enema. On this second occasion the attack was clinically not quite so severe, though the picture was that of a major illness. He was treated conservatively with penicillin and sulphonamide drugs. Urinary diastase was at the very high level of 1,024 units (normal 8–32 units). This reading was checked and confirmed. He improved rapidly, and on his discharge the diastase level was 32 units.

On October 25, 1948, he was readmitted for operation. A plain radiograph showed the absence of calculi. At operation the hepatic pedicle was dissected and the common bile duct freed. The duct was a little dilated and the lower end was patent. There were many adhesions following the previous operations, and the pancreas was hard and thickened. The bile duct was divided low down and the lower end ligated and buried behind the duodenum; the upper end was anastomosed to the side of the jejunal limb. A Wangensteen enterostomy was made in the limb and a catheter passed up through the anastomosis into the bile duct, the end of the catheter being brought out through a stab wound in the flank. The catheter was accidentally removed 48 hours after operation, but there was no leakage of bile. Recovery was uneventful and he was discharged on November 13, 1948, since when he has had no pain whatever and has gained much weight. For the first time in thirty years he can eat what he likes, including cream and butter. He has no constipation. The improvement in his physique and outlook is remarkable, and he is embarrassingly grateful.

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A Bony Tumour of the Breast

Reports of tumours of the breast containing bone or cartilage are few. Cooper (1829) described one removed from a women of 32. Bowlby (1882) saw a "sarcoma" with small foci of cartilage; Durham (1884) and Battle (1886) saw similar tumours classed as sarcomata. Bruce Clarke's (1890) tumour was so calcified that it had to be cut with a saw. Metastases are not mentioned in these reports. Morton (1904) saw a sarcoma with zones of cartilage which developed metastases in the skin, in skeletal muscle, and in a finger. Deaver and McFarland (1918) collected a series of 24 cases, found them so varied that it was difficult to describe them collectively, and suggested that the bone and cartilage resulted from metaplasia of connective tissue. Unfortunately McIver (1923) then reported a teratoma containing an alveolar process with teeth. Dyke (1926) saw a cystic mass containing bone, spindle cells, and multinucleated giant cells, but did not commit himself regarding its nature. Mallory (1933) saw a case very similar to that seen by Dyke, and Rottino and Howley (1945) reported a bone-forming giant-cell tumour in which lung metastases caused death. In our case bone is the predominant feature.

CASE HISTORY

A married woman aged 67 who was under treatment for hypertension was found to have a lump in the left breast. She had been aware of it for some months. It was painless and not tender, and the skin showed retraction. A diagnosis of carcinoma was made, and it was decided to carry out a simple mastectomy and irradiate. The breast was removed in November, 1952, and 15 months later there had been no recurrence of growth.

Pathology.—A bulky breast containing, 5 cm. from the nipple, a globular bony tumour 3.5 cm. in diameter, separated from the skin by a thin fibrous layer and from the deep muscles by 3 cm. of breast fat. The skin was dimpled over the tumour and the rest of the breast appeared normal. The tumour was cut in half with a saw. A central cavity 1.5 by 1 cm. contained blood-flecked white gelatinous material and some straw-coloured fluid. The cut surface resembled the cut shaft of a long bone. Histological sections showed inactive fibrous tissue and scanty red cells lodged in a meshwork of bone. No marrow, no giant cells, and no cells suggestive of epithelium were found. The tumour was surrounded by laminated fibrous tissue, the irregularity of which suggested that it was derived from the surrounding breast. Section of the jelly in the central cavity showed whorls of oedematous fibrous tissue with zones of haemorrhage.

COMMENT

In the reported cases bone is described in nodules, in plates, and sometimes as an osteoid matrix. Rottino and Howley mention a case in which bone was found only in the metastases. Central cavities have been seen by Lange (1881) and by Mallory, who thought it was due to a central necrosis. Cooper notes pain intensified at the menstrual periods, but does not record a cavity. Dyke mentions three possible origins for these tumours: deposits from a tumour elsewhere, metaplasia following chronic irritation, and origin from totipotential cells. Rottino and Howley found that in 10 of the reported cases a fibroadenoma was in juxtaposition with a giant-cell tumour.

In our case the absence of epithelium makes it difficult to suppose that bone formation has occurred by metaplasia in a fibroadenoma or in a carcinoma. No giant cells are present to suggest that it is one of the potentially malignant "myeloid tumours," and there is no evidence of a primary tumour elsewhere. Nor is there anything to suggest that it is a teratoma such as that reported by McIver.

If the remote possibility of the traumatic transference of osteogenic tissue from the chest wall is ruled out, the final conclusion is that a bony mass has resulted from the metaplasia of pre-existing fibrous tissue—and there is no evidence regarding the condition of that fibrous tissue when bone formation began. It may have been that normally present, or that in an inflammatory site or in a neoplasm crushed out of existence by the bony proliferation. No precise classification is possible.

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Reviews

DISEASES OF THE LIVER

Diseases of the Liver and Biliary System. By Sheila Sherlock, M.D., F.R.C.P. (Pp. 720+xv; illustrated. 50s.) Oxford: Blackwell Scientific Publications. 1955.

There has been a considerable reorientation of knowledge of diseases of the liver in the last 20 years. Concepts such as those of virus hepatitis, nutritional cirrhosis, and portal hypertension have brought our data into co-ordinated relations, and such techniques as hepatic puncture, portal venography, and improved methods of visualization of the gall-bladder and biliary tract have ensured greater precision in diagnosis. Treatment has been improved by the introduction of portacaval anastomosis and the interruption of the connexions between the portal vein and the oesophageal varices. The time was therefore ripe for a new textbook on liver diseases, and no better author could have been found than Dr. Sheila Sherlock, for she with her co-workers has contributed notably to the advance in knowledge, and in addition she has the gift of clear exposition.

The danger in a book of this kind is that it should fall into two unrelated halves, the physiological half and the clinical half. Indeed, there is no harder task than to write a scientific textbook of medicine. Dr. Sherlock has avoided this danger by approaching the subject successively from the different aspects of the four components of the liver—the hepatic cell, the blood vessels, the bile ducts, and the reticulo-endothelial system. An account of the anatomy and physiology of the liver cell leads on to a discussion of liver function and hepatic insufficiency. Portal hypertension is described and the way is then open for an account of hepatitis and cirrhosis. The various types of jaundice and hepato-lienal disease are described, and finally there are chapters on the biliary system and its diseases. No one can read of the advance in this field without satisfaction, but there is still a lot we do not know, such as the normal mode of survival of the virus of homologous serum jaundice. Also one might differ from Dr. Sherlock in believing that the syndrome described by Watson and Hoffbauer as cholangiolitic biliary cirrhosis is the same as the primary biliary cirrhosis of Ahrens *et al.*

The book is well produced and beautifully illustrated; it is a magnificent bargain.

L. J. WITTS.

KINNIER WILSON

Neurology. By S. A. Kinnier Wilson, M.A., M.D., D.Sc., F.R.C.P. Edited by A. Ninian Bruce, F.R.C.P.(Edin.), D.Sc., M.D., F.R.S.(Edin.). Volumes I, II, and III. Second edition. Foreword by Sir Russell Brain. (Vol. I, pp. 702+xiii+31 pp. index; Vol. II, pp. 703–1351+viii+22 pp. index; Vol. III, pp. 1355–2060+viii+99 pp. index. Illustrated. £10 10s. per set, 70s. per volume.) London: Butterworth and Co. Ltd. 1954.

This second edition of Kinnier Wilson's classical text is in effect a reprint with occasional additions or emendations by Dr. Ninian Bruce. It was he who undertook the work of putting the unfinished book—which had occupied most of Wilson's professional life—into a form fit for publication, and when it appeared a couple of years after Wilson's death it was accepted, in spite of its incompleteness, as a record of his great learning. It sold well because it represented the height of descriptive clinical neurology, and because it was of great value as a work of reference, particularly to British and European sources. A reprint might have sold as well as a second edition no doubt will, but the publishers have increased its usefulness by dividing it into three volumes, by improving the index, which was previously deplorably inadequate, and by re-presenting the enormous bibliography in standard form.

Nothing need be said about the bulk of the text, for it has been used for fifteen years and is well known. It has been modified here and there to reflect changes in attitude, and paragraphs have been added to include, particularly, therapeutic advances. It is when these paragraphs are read in the context of Wilson's original text that one realizes how far we have travelled since his death—a distance so great that the editing should have been more ruthless: in altering the original text, in rearranging material, and in the integration of new facts, opinions, and fashions with old.

The second edition ceases to be acceptable when Wilson's text ends, for each chapter has an inadequate and often inaccurate addendum, seeming to be continuous with the original text. Many of these additions are too ludicrous to be dangerous. Take just one example—that of "The Epilepsies." Here the whole field of electrophysiology has fifteen lines, and the only two illustrations of electroencephalograms show a spike-and-wave discharge described as the discharge of grand mal after leptazol; a little farther on the section headed "Medication" begins—"First place must be assigned to bromide, introduced by Locock in 1857"; while the heading "Surgical Treatment" is followed by a few lines concerned mainly with trephining. Of greater consequence are the statements that in status epilepticus, where efficient and early management is so essential if death is to be averted, "repeated drainage of spinal fluid by lumbar puncture is also serviceable, and instillation of bromide by the same route has sometimes been beneficial," while "venesection and injection of saline can be performed in the robust."

The second edition will have an interest for bibliophiles, but in the eyes of the world it will bring no credit to modern English neurology, in spite of Russell Brain's admirable new chapter on the aphasias.

DENIS WILLIAMS.

REGULATION OF THE CIRCULATION

Kreislaufregulation: Eine Physiologische, Pathophysiologische und Klinische Studie. By H. Reindell, E. Schildge, H. Klepzig, and H. W. Kirchhoff. Foreword by Ludwig Heilmeyer. (Pp. 315+viii. D.M. 39.60.) Stuttgart: Georg Thieme Verlag. 1955.

This book on regulation of the circulation is described in the subtitle as a "physiological, pathophysiological, and clinical study." For many years the concept of morbid anatomy based on the "salutary lessons of the deadhouse," as Osler used to say, was the foundation of clinical diagnosis; but these were really the end-results. In the last generation much more is understood about derangement of function in the living, and "morbid physiology" should come into its own; then the "salutary lessons" might be learnt earlier, and the deadhouse avoided or postponed. In this book great stress is laid upon the effect of mental influences on the function of the circulation and heart, all of which is most important and apt to be neglected even in these days. The effect of fear *about* the heart *on* the heart and its function is emphasized; for here a vicious circle is instituted by which the engendered dysfunction attracts attention and causes more fear.

There is an interesting section on the effects of mental states on the circulation, particularly in fainting. There are numerous cardiographic studies showing the effect of posture and exercise. It was particularly interesting to see how the forms of the cardiograms could be altered by hypnotic suggestion; on the suggestion of pain the T waves became abnormal, while pleasant suggestions improved them. The authors hold the view that modern civilization has many deleterious effects on the regulation of the circulation; these are in addition to the congenital somatic tendencies to derangements of the vegetative or sympathetic nervous system.

This is a thoughtful and thought-provoking book which deserves the attention of cardiologists as well as those with more general interests; a subject of wide importance is presented from a wide angle with much sane common sense on a sound physiological and psychological basis. How nice it is to have a book with a marker! This is sound psychology.

TERENCE EAST.

E.N.T. IN CHILDREN

Diseases of the Ear, Nose, and Throat in Children. By T. G. Wilson, M.B., B.Ch., Litt.D., F.R.C.S.I., M.R.I.A. (Pp. 307 +xii; illustrated. 70s.) London: William Heinemann Ltd. 1955.

This is the first book on this specialty in children. Its general pattern follows that of textbooks devoted to the subject, though naturally the emphasis is on the effect of infections on infants and young children and on the congenital deformities to which they are subject. As specialist to the Children's National Hospital in Dublin, the author's experience of deformities is wide, and he describes and illustrates by photographs and radiographs a great variety. He finds that deformities of the oesophagus are as frequent as deformities due to cleft-palate and hare lip. Fenestration affords some help in restoring hearing in cases of (congenital) deformities of the middle ear. Acute ear infection in infants is looked on as serious—and hospitalization worse, in spite of all precautions to prevent cross-infection.

Perhaps the most interesting chapters are those on the causes of deafness. Here the author sets out the means of discovering deafness and of assessing its degree, and discusses the methods of training and educating the deaf child. The author's views, as well as those of Carhart, Kendall, the Ewings, Whetnall, and others, are explained in detail. A chapter on defective speech is most helpful; the author gives a clear account of development of speech and of the various defects from whatever cause, paying special attention to stuttering, its causes and treatment. The illustrations are excellent; some are in colour, some are drawn by the author, and others are taken from various sources previously published; the book is very well produced.

W. M. MOLLISON.

KINESIOLOGY

Kinesiology of the Human Body under Normal and Pathological Conditions. By Arthur Steindler, M.D., F.R.C.S., F.A.C.S., F.I.C.S. (Pp. 708+xxiv; illustrated. £7 2s. 6d.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1955.

Steindler is well known to many in this country. His *Mechanics of Normal and Pathological Locomotion*, published 20 years ago, met with an indifferent reception. He now gives us rather a large book with a title that is frightening. A reader will soon appreciate that the subject is one that has been studied and taught too little. Briefly, it covers the essentials of applied physics, physiology, and anatomy of bones, joints, muscles, and every other structure that is used in the mechanics of the locomotor system. Further, it includes a description of the changes in the physiology and anatomy resulting from trauma and disease. The study is not so much of the pathology of the morbid condition, but of the modifications arising in the affected and other tissues able to carry on function. This is most useful, and can be considered a basic science for those entering a specialty such as orthopaedic surgery or physical medicine.

The physical properties of such tissues as bone and cartilage are studied. The mechanics of posture and joint movement, of the spine, pelvis, and particular joints, attract attention; the normal and abnormal are described. The details of the mechanics of hip, knee, and foot will interest surgeons. The extent of function existing after paralysis is analysed and the scientific basis for reconstructive and other operations described. This should be useful information when difficult problems arise.

Steindler has studied this subject for many years and indicates so many principles that the importance of the book will be readily recognized. Its study requires concentration; there may be differences of opinion on detail, but its value is unquestionable. The mathematics will be beyond many and will help few. Illustrations, diagrams, and references are excellent, and the whole production is of a high standard. This is a book to be read for basic knowledge and then kept for reference.

ST. J. D. BUXTON.

DIAGNOSTIC RADIOLOGY OF THE SKULL

Röntgendiagnostik des Schädels. By Professor Dr. Willy Loepp and Professor Dr. Reinhold Lorenz. (Pp. 579+xv; illustrated. D.M. 97.) Stuttgart: Georg Thieme. 1954.

It is well recognized that the Germans have a capacity second to none for writing encyclopaedic works. This book is such an example, and as a reference to the plain *x*-ray changes seen above the neck it probably has no rival. Originally conceived by Loepp, he unfortunately died before it was put together, and the final writing and arrangement was left to Lorenz.

It is difficult to find omissions of any importance, though more stress is placed on some aspects, such as the teeth, than the reviewer would have considered justified, and less on others. The approach to the subject is somewhat archaeological rather than neuroradiological. If one could imagine a perfectly stocked morbid anatomical museum devoted to the skull, lower jaw, and teeth, and could then take *x*-rays of all the specimens, one might compile such a book as this. Over a third of the work is devoted to the temporal bone, the sinuses, the orbits, and the teeth and jaws. As one reads one cannot help feeling that much of the contents is as dry as an old skull dug out from the desert; but all that is known is well recorded.

Within the limitations of the title—diagnostic radiology of the skull—there can be no serious criticisms and much praise. Any radiologist, neurologist, or neurosurgeon who reads German would find this book invaluable. The illustrations are, for the most part, of a high order and well selected, but nowadays radiological contrast methods are so essential in neurology that it is frustrating that they are not described. Plain radiographs, important as they are, must be only the first step to the next radiological procedure in the vast majority of neurological conditions where radiology can be of help. If Dr. Lorenz gives us another volume devoted to the more detailed radiological investigations of the brain, all criticism will be disarmed.

J. W. D. BULL.

FRENCH VIEWS ON WHOOPING-COUGH

La Coqueluche. By Julien Marie, Georges Sée, and Edouard Eliachar. Preface by Robert Debré. (Pp. 290; illustrated. 2,000 fr.) Paris: Expansion Scientifique Française. 1954.

This, the only book on whooping-cough published in France for 30 years, is timely in view of the recent advances in anatomy-pathology, radiology, and treatment. Professor Julien Marie and his associates give mainly French views, but do refer occasionally to other literature. The book contains chapters on history, epidemiology, mortality, bacteriology, immunology, pathology, clinical aspects, and treatment. The figures consist of charts, histological sections, and radiographs, the latter mainly showing the pulmonary shadows in complicated whooping-cough. The basic triangular shadows, regarded in Britain as evidence of atelectasis, are explained as due to multiple foci of stagnation within numerous bronchioles, since Marquézy demonstrated that the corresponding bronchi were not impervious to "lipiodol" and were sometimes even dilated. The authors seem to argue from this and other observations (without any evidence of follow-up) against bronchiectasis being a danger in whooping-cough, and they make no mention of postural drainage in treatment. The convulsions of whooping-cough are described under the heading of "encephalitis," although histology admittedly lends no support to this idea. Prophylactic inoculation is described in detail, but there seems to be no personal experience of poliomyelitis following such injections. There are no strong recommendations for curative treatment in simple whooping-cough, but antibiotic therapy is held to be justifiable in infants and children under 5 years of age (presumably mainly in hospital cases). In grave cases "tri-treatment" is advocated—streptomycin, an oral antibiotic, and hyperimmune serum. For "encephalitis," treatment by "artificial hibernation" is mentioned, without, however, any details.

H. STANLEY BANKS.

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FIBROCYSTIC DISEASE OF THE PANCREAS

Fibrocystic disease of the pancreas has been well recognized in the United States since D. H. Andersen[1] published her first paper on it just over fifteen years ago, and it is now more than ten years since cases in any number began to be diagnosed in Britain. The incidence is about one to every 1,500 live births. Two monographs on it have appeared recently, one in Britain,[2] the other in the United States,[3] and in this issue of the *Journal* Dr. J. H. Hutchison gives an excellent clinical account of the condition. The disease is a familial condition, inherited as a recessive characteristic. The chance that a child of two carriers, themselves unaffected, will have the disease is one in four. Several consecutive children in a family may suffer from it, or only one or none may be affected, the chances being the same for each child.

In the newborn child fibrocystic disease of the pancreas may present as meconium ileus, with failure to pass meconium and consequent symptoms of acute intestinal obstruction. Abdominal distension is present from birth, and vomiting, generally bile stained, follows within a few hours. Surgical relief of the obstruction is not often successful, and the babies who survive always develop the later symptoms of fibrocystic disease. In the great majority of cases symptoms are present from earliest infancy. Characteristically these consist in a failure to thrive satisfactorily in spite of a ravenous appetite, and the frequent passage of loose, pale, and highly offensive stools. A persistent slight cough is soon noted, and may remain insignificant, or the child may develop a paroxysmal cough of extreme severity, or even fatal bronchopneumonia. The group of symptoms that predominate may be either respiratory or alimentary, and either may remain inconspicuous for some years. With increasing age the child fails to maintain normal height and weight; usually clubbing of the fingers appears, together with an emphysematous distension of the chest, particularly in the upper part, some distension of the abdomen, and wasting of the limbs. In the days before antibiotics were available the child commonly died in early infancy, while some affected children lingered on into adolescence before dying of pulmonary sepsis, or of emphysema and cardiac failure. Before the disease was recognized for what it is these children were labelled as cases of marasmus, coeliac disease, whooping-cough and pneumonia, cystic lung, and bronchiectasis.

The pathogenesis of the condition is not yet known. Histological studies show the mucous glands throughout the body to be distended with mucus, a condition which S. Farber[4] and M. Bodian[2] believe to be the basic pathological lesion, and for which the latter suggests the name of mucosis. There is extensive fibrosis of the pancreas, with a varying degree of destruction of the parenchyma, and distension of the remaining ducts and alveoli with an eosinophilic material. Excess of viscid mucus obstructs the bronchi and smaller bronchioles, and the lungs show secondary patchy alveolar collapse and widespread emphysema. Infection leads to bronchiectasis, bronchopneumonia, and peribronchial abscess formation. The most generally held theory is that the mucus is abnormally viscid; the abnormal mucus obstructs the pancreatic ducts and the respiratory passages; it causes the meconium to be firm and glutinous in those children who develop meconium ileus. A finding which is difficult to explain on the basis of this theory is that children with this disease, and some members of their family, have a high concentration of chloride in their sweat, suggesting a general metabolic disturbance.[5]

Treatment is based on maintaining good nutrition by means of an ample diet high in calories and protein but somewhat short of fat. Pancreatin (*B.P.* triple strength) is usually given before meals; if taken in large enough quantities, it moderately increases the absorption of fat and nitrogen. Control of respiratory infection is the most important aspect of treatment. The staphylococcus is the main infecting organism in all untreated cases, but penicillin is not very beneficial, possibly because it does not reach the organisms concentrated within the lumina of the bronchioles, or possibly because the abnormal mucus impedes its action. The sulphonamides are virtually useless. Aureomycin and terramycin are most effective, and the immediate prognosis has been immensely improved since their introduction. Unfortunately, insensitive organisms are apt to appear, and the risk of this makes the most effective use of these

[1] Andersen, D. H., *Amer. J. Dis. Child.*, 1938, **56**, 244.
[2] Bodian, M., *Fibrocystic Disease of the Pancreas*, 1952, London.
[3] May, C. D., *Cystic Fibrosis of the Pancreas in Infants and Children*, 1954.
[4] Farber, S., *New Engl. J. Med.*, 1943, **229**, 653.
[5] Darling, R. C., *et al.*, *Amer. J. med. Sci.*, 1953, **225**, 67.
[6] Stoppelman, M. R. H., and Shwachman, H., *New Engl. J. Med.*, 1954, **251**, 759.
[7] Norman, A. P., in *Recent Advances in Paediatrics*, Gairdner, D., Editor, 1954, p. 257, London.

antibiotics by no means easy. The choice lies between prophylactic doses daily or interrupted courses, their prescription alone or in combination, their administration by mouth or by aerosol. M. R. H. Stoppelman and H. Shwachman[6] have recently reported favourably on the continual administration of antibiotics by mouth for periods as long as five years, singly or in combination, and in a dosage usually a little below the ordinary therapeutic level. They found that the development of insensitive organisms in the nasopharynx rarely affected the satisfactory response to the antibiotic used, and they concluded that the determination *in vitro* of the sensitivities of organisms in the nose or throat was no guide to the use of antibiotics. These conclusions are not entirely compatible with other experiences in the prescription of antibiotics, nor with the experience of A. P. Norman[7] in the treatment of fibrocystic disease. Norman has found the routine testing for sensitivity of organisms from the throat swab a useful guide to the probable response to antibiotic therapy, particularly in those cases with severe pulmonary damage and liable to be infected with *Pseudomonas pyocyaneus*. Aerosol inhalation of antibiotics, particularly streptomycin, has proved beneficial, but has the theoretical disadvantage that insensitive organisms may rapidly appear. Aerosol inhalation of mucolytic agents seems logical, and in spite of discouraging reports of its value in the treatment of chronic bronchitis in adults it has proved of some value in fibrocystic disease of the pancreas. It requires further trial.

MORBIDITY TRENDS IN THE SERVICES

A rare browsing pasture for the statistician is provided by two cyclostyled volumes, one issuing from the War Office and reporting on the health of the Army in 1951 and 1952, and the other from the Air Ministry on the health of the Royal Air Force in the latter year.[1] Since the end of the war two reports on the health of the Army have appeared, one triennial and the other biennial; the third, now before us, is the last in which it is proposed to deal with more than one year at a time. Henceforward the reports will be annual. The other volume is the first postwar report to be released by the Royal Air Force for open publication. Since the figures relate to a selected class of persons, mainly young and presumably fit, comparisons with the civilian population will be misleading. Another difference is that many of the persons included are not stationed in these islands, but often in parts of the world where climate and other conditions expose them to peculiar risks.

Among medical discharges from the Army in 1952 psychiatric disorders accounted for 4.1 males per 1,000 strength, the largest group being the anxiety neuroses. Discharges for all other diseases were 9.1 per 1,000, and among these pulmonary tuberculosis stood highest (1.2), followed closely by gastric and duodenal ulcers (1.1). In the women's services the discharges for psychiatric disorders were much higher—15.0 per 1,000 strength. The discharges of Army recruits during selection procedure tell the same story. In 1952 the total discharges were 8.75 per 1,000 intake, and of these nearly one-half were on account of psychiatric conditions. One feature of the morbidity trends is the increasingly high incidence of appendicitis and peptic ulcers. The increase in invalidity in the Army on these grounds was almost consistent during the six years ending in 1952, a period during which the general level of sickness was not rising. The explanation suggested is that an increasing number of cases of ill-determined pain are now given a provisional diagnosis. The incidence of appendicitis among women in the Army is three times as great as among men, though peptic ulcers figure much less largely in the women's services.

Apart from discharges, the sickness rate in the Army as measured by admissions to hospitals and other medical units was 274 per 1,000 strength for the two years 1951–2. The chief causes for such short illnesses were tonsillitis and pharyngitis, with all types of skin conditions coming next, and, a long way down the list, the common cold. In the British Army on the Rhine, however, skin conditions headed the list, and tonsillitis and pharyngitis were far in the rear. Venereal diseases accounted for 5.5 per 1,000 strength among the admissions to hospitals in the United Kingdom in 1952, 15.3 in the British Army on the Rhine, 13.4 in the Middle East land forces, and increased eastwards until in Korea and Japan, the Korean war then being in full blaze, the figure was 262.

In the Royal Air Force in 1951 the picture is somewhat different, but the highest place for invalidings-out was again what is described as mental disorder, being 21% of total invalidings. Next came diseases of the ear and mastoid process (20.67%), and then all forms of tuberculosis (11.6%). But again there is the marked sex difference. In the Women's Royal Air Force mental disorder accounted for 43% of the final invalidings, tuberculosis coming next (12%). Among the men there were 703 cases of scarlet fever

[1] *Report on the Health of the Army 1951 and 1952.* By command of the Army Council, December 31, 1954. W.O. Code No. 11055. *Report on the Health of the Royal Air Force and Women's Royal Air Force for the Year 1951.* By command of the Air Council. A.P. 3319/51.

and 839 of streptococcal sore throat, and of these all but a negligible number returned to duty.

Another interesting point brought out in these compilations is the incidence of infectious disease. In the Royal Air Force over the years 1946 to 1951 the incidence of acute poliomyelitis almost steadily declined and that of chicken-pox and measles went up; but the most striking increases were in scarlet fever, which went up over the same period from 0.71 to 2.76 per 1,000 strength, and in rubella, which went up from 1.91 to 3.70. In the Army the total figures are of little significance because of the wide differences between the different commands at home and abroad. In Germany the incidence of poliomyelitis among troops and their families in 1952 was the highest on record; diphtheria remained low everywhere, even in Germany, where a high rate among the British troops had previously been experienced, and the incidence of the enteric group of fevers was negligible except in the Middle East.

To take a larger sweep of years, how do these figures of three or four years ago compare with those before the war? The year for which the last open report was published by the Royal Air Force was 1937. At that time the invaliding rate was 5.6 per 1,000 strength, contrasting with 15 per 1,000 in 1951. But in 1937 all the men were volunteers. The National Service Act has brought in a larger miscellany of individuals and has also changed the age structure. Perhaps stricter medical standards play a part. But the average number of days' sickness has improved on the pre-war record, and the death rate (in 1951 only 2.2 per 1,000) is little more than half of what it was in the pre-war year.

VISIT OF RUSSIAN DOCTORS

Six eminent members of the Russian medical profession are to be the guests of the British Medical Association during the last fortnight of October and the first week of November. They are coming in response to an invitation issued three years ago and renewed last year. The names and appointments of our Russian guests are as follows: Professor S. A. Sarkisov, Director of the Scientific Brain Institute of the Ministry of Health of the U.S.S.R.; Professor V. V. Kovanov, Director of the School of Operational Surgery and Topographical Anatomy of the first Moscow Order of Lenin Medical Institute; Professor G. F. Gause, Deputy-Director of the Institute of Research for New Antibiotics of the Academy of Medical Sciences of the U.S.S.R.; Professor L. F. Larionov, Director of a Department of the Institute of Experimental Pathology and Therapeutics of Cancer of the Academy of Medical Sciences of the U.S.S.R.; Professor M. N. Foteeva, Director of the Biophysical Laboratory of the Institute of Therapy of the Academy of Medical Sciences of the U.S.S.R.; Dr. L. G. Bogomolova, Director of the Laboratory of Blood Donors of the Leningrad Institute of Blood Transfusion.

Plans for their reception have been made with great care so that our colleagues from the U.S.S.R. may in the time available see as much as possible of the principal research centres and hospitals in England, and it is hoped, too, that a visit will be paid to Edinburgh. There will be full opportunity for our guests to meet their British colleagues on the social occasions being arranged. Everything will be done to make them welcome both for their own sakes and for this further manifestation of the Russian desire to break down the barriers between the U.S.S.R. and Western Europe, barriers which were lifted for a time during the war when as allies we were fighting a common enemy, a time when we were able to publish in this *Journal* many articles on Russian medicine.[1] But the period of estrangement known as the cold war, when allies in two world wars became hostile to each other, shut the door on communications between scientific and professional groups in Russia and the non-communist world. At least, communication became difficult, and, indeed, seemed to some extent to depend as much upon an ideological as upon scientific curiosity. Medicine, to repeat a well-worn but sound maxim, knows no frontiers. The coming and eagerly awaited visit of the six Russian doctors will, it is hoped, be one more step towards international co-operation in medicine, a co-operation already manifest in such institutions as the World Health Organization and the World Medical Association. Language is unfortunately one formidable barrier, but translations and interpretation will overcome this to some extent, an extent that will be rapidly lengthened if the desire for communication grows. Through *Abstracts of World Medicine*, which surveys some 25 Russian medical periodicals, we have been able to give British readers a glimpse of what Russian medicine is doing. But on the whole our ignorance of Russian medicine is probably as great as is the ignorance of British medicine among our colleagues in the U.S.S.R. Let us hope that the coming visit is the harbinger of an era of a new and friendly co-operation between two professional groups who have one great thing in common—the preservation of health and the cure of sickness.

[1] *British Medical Journal*, 1942, **2**, 445; 1943, **1**, 134 and 785; 1943, **2**, 203 and 567; 1944, **1**, 220; 1945, **1**, 175 and 177; 1945, **2**, 37 and 88.

RADIOLOGICAL PROTECTION

It is fitting that the latest recommendations of the International Commission on Radiological Protection should appear as a supplement to the *British Journal of Radiology*, for the British Institute of Radiology was closely associated with the original *X*-ray and Radium Protection Committee, which was the first body to issue recommendations on radiation protection, and it has ever since kept a watchful eye on these matters. The International Commission was set up in 1928 under the auspices of the International Congress of Radiology to "familiarize itself with progress in the whole field of radiation protection" and to prepare recommendations on radiation safety standards. These recommendations were to be on the basic principles of radiation protection; the detailed technical regulations were to be worked out by the separate international committees.

The motive for setting up radiological protection committees in the first place was the desire to protect people working with *x* rays or radium from the delayed, but sometimes fatal, injuries to which many radiologists of an earlier generation had fallen victim. It was the health and safety of the exposed person which were at that time taken as the criteria in determining permissible radiation exposure, and the recommendations made, in so far as they were observed, did eliminate the risk of serious injury to the individual worker. Since the number of people exposed to radiation has greatly increased in the last fifteen years, and is likely to continue increasing as nuclear energy and radioactive isotopes find wider industrial applications, it has been necessary to re-examine permissible radiation levels from the point of view of the effect on the population as well as that on the individual. The ever-increasing energy and diversity of the radiations available have also posed new problems in dosimetry and in methods of shielding. When issuing their previous recommendations in 1950 the International Commission recognized the need for new detailed studies of all aspects of radiation protection, and set up a number of expert subcommittees to undertake the work. The present recommendations are the fruit of these new studies and they occupy some ninety-two printed pages. They are much more than a bald statement of permissible dose levels. Some of the subcommittees, but unfortunately not all of them, have been at pains to include a synopsis of the observations and calculations on which their recommendations are based. This frank and informative presentation should be of great value in helping to persuade all who work with these rays to keep within the recommended limits. The matters discussed range from physical questions of dosimetry, layout of *x*-ray installations, and data on radio-isotopes to the "relative biological efficiency" of different types of radiation, the "critical body organ," and the chemical composition of "the standard man." It is reassuring to know that so much expert study has already been given to this relatively new occupational hazard and that subcommittees composed of Commonwealth, American, and European members have been able to reach agreement on permissible radiation levels. It is to be hoped that the Subcommittee on the Disposal of Radioactive Wastes and Handling of Radioactive Isotopes, which has not yet issued a report, will be able to do so in the near future.

The International Commission does not concern itself with methods of carrying out its recommendations, and few of the member countries have yet given them legal force. It is probably better if the improved standards of protection can be achieved by education rather than by legislation, and this method has on the whole been successful in Britain. The Ministry of Health and the Medical Research Council share the responsibility for drawing up a code of practice here, and they have recently established a Radiological Protection Service to provide information and advice on all aspects of radiological protection.

ACCIDENTAL COAL-GAS POISONING

For some years the number of deaths from accidental coal-gas poisoning has been about 500 annually in England and Wales, and it has latterly tended to rise. In 1953, the latest year for which figures are published, 279 males and 312 females died in this way, a total of 591. Most of these deaths were of old people; under the age of 60 the rate was 5.6 per million population, while for people aged 60 and over it was 54, or ten times as great. Reviewing in this *Journal* last year 100 cases of deaths from carbon monoxide poisoning, most of them due to coal gas, Dr. Keith Simpson[1] wrote of "the very urgent need for tackling the problem." His analysis showed that while human frailty was the cause of some of these deaths—drunkenness, illness, and carelessness all playing their part—mechanical defects caused others. The Science Committee of the B.M.A. has now set up a subcommittee[2] "to inquire into the problem of accidental death and ill-health from coal-gas poisoning, and to make recommendations," and it invites members of the medical profession to submit information and suggestions that may help it in its investigation of the subject. They should be sent to the Secretary of the B.M.A., at B.M.A. House, Tavistock Square, London, W.C.1. The subcommittee will devote attention first to the prevention of accidents in the home, later to ill-health caused by coal gas; accidental coal-gas poisoning in industry is rare and under constant study, so that it will be omitted from the committee's deliberations. The treatment of carbon monoxide poisoning is discussed by Dr. A. Thelwall Jones in a "Refresher Course" article at p. 373 of the *Journal* this week.

In these columns last year[3] the suggestion was revived that an obnoxious gas might be added to the domestic supply of coal gas, and the legal objection to it commented on. This seems to be a precaution well worth further investigation, including a study of those gas supplies in the U.S.A. to which mercaptan is added. The gas industry itself, aided by the Ministry of Fuel and Power, is concerned with the development of safety

[1] *British Medical Journal*, 1954, **2**, 774.
[2] Members: Professor Esther M. Killick, Drs. W. N. Leak (chairman), J. R. Nicholson-Lailey, A. Lloyd Potter, C. Keith Simpson, F. H. Tyrer.
[3] *British Medical Journal*, 1954, **2**, 801.

devices, among them now the possibility of adding to gas cookers pilot lights that would light up if the gas were not turned fully off. But since doctors are often early on the scene in cases of gas poisoning they have a special opportunity to notice with a trained eye any circumstances related to the death that may later be lost to view, and to provide information of great value to the design of safe apparatus.

CLEARING THE AIR

The Clean Air Bill introduced into the House of Commons last week enjoys that general approval throughout the country without which its intentions would soon be frustrated. It gives effect to the recommendations of the Beaver Report[1 2] and has four main purposes. These are:

(1) To prohibit the emission of dark smoke from chimneys, railway engines, and vessels, subject to certain qualifications.
(2) To prohibit the installation of new industrial furnaces unless operated without emitting smoke.
(3) To require that the emission of grit and dust shall be minimized, and that new industrial furnaces burning pulverized fuel or large quantities of other solid fuel shall be provided with grit-arresting equipment.
(4) To empower local authorities by order, subject to confirmation by the Minister concerned, to declare "smoke-control areas," in which the emission of smoke from chimneys will constitute an offence.

In the smoke-control areas the owners or occupiers of private dwellings will receive grants towards the cost of adapting or replacing their grates and stoves for burning smokeless fuels. The grants will cover 70% or more of approved expenditure; the Exchequer will pay 40% and the local authority at least 30%.

Now that public opinion is roused against the harm done by atmospheric smoke to human health and comfort, the far-reaching measures to control its emission and constitution promised by this Bill have every chance of giving great benefit in heavily populated districts. The smog that killed about 4,000 Londoners in the winter of 1952–3 was a shocking reminder not merely of the dangers that can accompany unusual atmospheric conditions but more especially of the insidious risks to which the inhabitants of smoky cities are perpetually exposed. These have been found difficult to analyse, but J. Pemberton and C. Goldberg[3] recently showed that a significant correlation exists between the average sulphur-dioxide air pollution in the county boroughs of England and Wales and the mortality rates for bronchitis in men aged 45 and over. Results obtained by the Social Medicine Research Unit of the Medical Research Council[4] agreed with these, and showed an association between the consumption of domestic coal per acre and mortality from bronchitis in males. Moreover, G. R. Clemo and his colleagues at Newcastle-upon-Tyne, pointing out that the carcinogenic action of soot has been recognized since Pott described chimney-sweep's cancer of the scrotum in 1775,[5] report they have isolated from chimney smoke two substances that are carcinogenic to mice.[6]

The Bill recognizes that if its objects are to be achieved suitable fuel must be available, no doubt in greater quantities than at present. Whether it will be seems problematical in view of the industrial crises that often delay or diminish the supply of coal and anthracite. Consequently, while this Bill is a bold attempt to reduce one of the worst menaces to health at the present time, perhaps the hope of a more drastic cure lies in an observation of Sir John Cockcroft, recently reported in the press, that by 1975 almost half of Britain's electricity will be generated by atomic power—the equivalent of the amount produced by 40 million tons of coal a year.

[1] *Report of the Committee on Air Pollution*, 1954, H.M.S.O.
[2] *British Medical Journal*, 1954, **2**, 1340.
[3] Pemberton, J., and Goldberg, C., ibid., 1954, **2**, 567.
[4] Daly, C., ibid., 1954, **2**, 687.
[5] Pott, P., *Chirurgical Observations*, 1775, London.
[6] Clemo, G. R., *et al.*, *Brit. J. Cancer*, 1955, **9**, 137.

COST OF COSTING

The introduction of departmental costing in the hospital service has got a stage further. Nearly three years ago the Nuffield Provincial Hospitals Trust and King Edward's Hospital Fund for London produced reports calling attention to the drawbacks in the present method of accounting for hospital expenditure. As was pointed out in a leading article in the *Journal*[1] early this year, this method apportions expenditure under the different subject headings—salaries and wages, food, drugs, fuel and power, and so on—from which the hospitals' budgets are drawn up before the beginning of each financial year. The cost of maintaining an in-patient for a week is then estimated by dividing the number of patients into the total weekly expenditure. Since, however, a large out-patient department, with all the expenditure on staff and services that it entails, must inflate the cost, calculated in this way, of maintaining an in-patient, the present hospital returns make an allowance for the distorting effect of out-patient expenditure on the basis that five out-patient attendances equal one in-patient day. They also allow for the "vacant bed factor"—that is, for beds staffed but not used. But both the Trust and the Fund pointed out that a realistic method of calculating a hospital's costs would be based on the actual direct expenditure on each unit plus the share of administration and other overheads that is properly attributable to each unit.

A year later, accordingly, the Minister of Health set up a working party to devise a system of costing the departments and services of a hospital, and its report was published last week. Since the working party had to devise a system, rather than argue about principles, most of the details of its report will be of interest to administrators rather than to doctors. But it is worth drawing attention to one or two general points that emerge. First, the appointment of the working party did not mean that the Minister had—or has—any intention of abandoning the present system of analysing hospital expenditure under subject headings. Any form of departmental costing that may be introduced is to supplement the subjective analysis, not replace it; its purpose is to help hospital managements to achieve

[1] *British Medical Journal*, January 8, 1955, p. 92.

efficient and economic spending, not to enable regional boards and Ministers of Health to estimate more accurately the cost of the hospital service. The working party, in fact, explicitly states that far more research and experience are needed before a departmental costing system could be of value to the central distribution of funds.

Two members of the working party were indeed more cautious still. They express themselves as not sure that the cost of introducing a costing system and running it would be justified by higher efficiency and elimination of extravagance. They therefore urge the introduction of a much more limited scheme than is advocated by the majority of the working party, who recommend that the main scheme they have drawn up should apply to all acute hospitals with an expenditure of more than £150,000 a year.

No decision has yet been taken on the report, because the Minister is consulting the bodies concerned. The scheme recommended by the majority should enable more accurate comparisons to be made between hospital and hospital and help management committees to keep a closer watch on extravagance. But Mr. Macleod should satisfy himself that this advantage is of itself enough to justify the cost of costing. He will have to ask himself what incentive managements have to track down inefficiency and extravagance when real responsibility for running the hospitals is out of their hands. Until management committees are much more masters in their own house than they are at present, costing may add to hospital costs without saving the public a penny.

SIZE OF CHILDREN

It is sometimes said that an individual's size is more closely related to the size of his mother than to that of his father. It is not clear upon what evidence this assertion is based, and in respect of the relationship between size of parents and that of their mature offspring it is certainly wrong. Early in this century Karl Pearson and A. Lee[1] examined correlations between heights of parents and heights of their children aged 18 or over; they concluded that "the son and daughter are equally influenced by their father, and equally influenced by their mother." Similar results have been obtained in numerous cross-breeding experiments, and there is little doubt that any difference between the influence of the stature of the two parents on the size of their offspring is eliminated before adult life.

This conclusion does not exclude the possibility that the parents differ in their influence on the size of the child at birth. It was the observations of A. Walton and J. Hammond[2] on the horse which drew attention to the profound effect that the maternal environment may exert on birth weight. By artificial insemination they crossed large Shire and small Shetland breeds, and noted that the size of the foals at birth was much more closely related to the size of the dam than to the size of the sire. Similar results have been obtained in the rabbit by transferring fertilized ova from does of a small breed to does of a larger breed[3]; the size of the foetus at term was related to the size of the mother in whose uterus it developed.

The few observations on man relating size of children at birth to the size of their parents have given results which are contradictory. A. M. Ritala[4] found a higher correlation for both weight and length between mother and child than between father and child, but the results were not confirmed by B. S. Burke *et al.*[5] or by Lenner.[6] Findings more consistent with those of Ritala have recently been reported by R. H. Cawley, T. McKeown, and R. G. Record.[7] They examined two independent series of 1,028 and 506 Birmingham children, and noted that at birth and during the two years after birth infant weight is more closely related to height of mother than to height of father. Similar differences in the influence of the height of the two parents had previously been observed in children aged between 2 weeks and 13 years.[8]

The interpretation of these results seems reasonably clear. The size of the foetus at birth is due partly to the rate at which it has been growing, and partly to the length of time for which growth has continued. The association between infant size and parental stature is, however, independent of duration of gestation,[7] and must presumably be attributed wholly to an influence on the rate of prenatal growth. To some extent this rate is determined by the foetal genotype, to which both parents contribute equally. But in those species, and they include man, in which foetal growth is evidently restricted during the last stages of gestation, the size of the foetus at birth depends largely upon the maternal environment. The experimental results, with which the recent reports on man are consistent, appear to indicate that the resources of the maternal environment are related to the mother's size, being more adequate in large than in small mothers. This conclusion is supported by the observation that the association between the mother's height and the weight of the child at birth is greater in twin pregnancy than in single pregnancy, and for first than for later born.[9] That is to say, the influence of maternal size on infant size is most marked when the restriction on foetal growth during the last weeks of gestation is greatest.

There is as yet no precise information about the features of the uterine environment which are correlated with maternal size. The results of the Shire–Shetland cross suggested that the variation in birth weight might be accounted for by variation in placental size. But McKeown and Record[9] found that, though placental weight is more highly correlated with height of mother than with height of father, placental weight had little influence on the correlation between foetal weight and parental height. They concluded that the influence of the maternal environment on rate of foetal growth according to size of mother is not determined mainly by an influence on the size of the placenta.

[1] Pearson, K., and Lee, A., *Biometrika*, 1903, **2**, 357.
[2] Walton, A., and Hammond, J., *Proc. roy. Soc. B*, 1938, **125**, 311.
[3] Hunter, G. L., *et al.*, *Nature (Lond.)*, 1954, **174**, 890.
[4] Ritala, A. M., *Acta Soc. Med. "Duodecim." B*, 1935, **23**, 1.
[5] Burke, B. S., *et al.*, *J. Pediat.*, 1943, **23**, 506.
[6] Lenner, A., *Acta obstet. gynec. scand.*, 1943, **24**, Suppl. 1.
[7] Cawley, R. H., *et al.*, *Amer. J. hum. Genet.*, 1954, **6**, 448.
[8] Paton, D. N., and Findlay, L., *Spec. Rep. Ser. med. Res. Coun., Lond.*, 1926, No. 101, London.
[9] McKeown, T., and Record, R. G., *Amer. J. hum. Genet*, 1954, **6**, 457.

EMERGENCIES IN GENERAL PRACTICE

GASSING IN THE HOME

BY

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The recent publication of the Home Office figures on accidents in the home[1] emphasizes that all practitioners should be equipped to deal with a surprising number of emergencies.

Estimates of the number of non-fatal accidents are difficult to obtain, but analysis of the commonest kinds of fatal accidents reveals the importance of gassing as a cause. Of all the fatal accidents occurring in 1951, 58% were falls, 13% were burns and scalds, 12% were caused by suffocation, and 8% were coal-gas poisoning. Two-thirds of the deaths from coal-gas poisoning occurred in people over 65 years, and 80% of the suffocations in children under 5 years.

Although carbon monoxide is by far the commonest and most important cause of gassing in the home, an increasing number of possible agents are in use and may be classified as follows:

Asphyxiants which produce a deficiency of oxygen but do not directly injure the respiratory tract. (*a*) Simple inert gases which displace oxygen from the respiratory tract—for example, suffocation from fumes of fires. (*b*) Chemical substances which interfere with the vascular respiratory exchange—for example, carbon monoxide.

Irritants.—(*a*) Acting on the upper respiratory tract—for example, ammonia. (*b*) Acting on the upper respiratory tract and lungs—for example, chlorine, sulphur dioxide.

Centrally acting poisons which are absorbed through the lungs and produce anaesthesia—for example, trichlorethylene, carbon tetrachloride, methyl chloride, methyl bromide.

It is apparent, therefore, that when sudden and sometimes obscure illness occurs in the home the practitioner must consider the possibility of absorption of toxic gases.

Carbon Monoxide Poisoning

The importance of this poison is measured by the yearly death roll of about 500. Keith Simpson[2] pointed out how easily the possibility of gassing can be overlooked and has drawn attention to the preponderance of elderly people who are gassed as a result of forgetfulness, infirmity, or loss of sense of smell. Cases arise from the accidental turning on of gas-taps, insufficient ventilation or the blockage of flues, the use of common meters, from coke ovens, or from the running of car engines in garages. Incomplete combustion of butane (calor gas) in ill-ventilated rooms, ships, or caravans carries similar hazards.

Carbon monoxide, which has no colour, vapour, or odour, is absorbed through the lungs at a rate in proportion to the concentration in the atmosphere. It rapidly produces a throbbing headache and dizziness, followed by weakness of the legs and loss of consciousness. These effects are due to loss of functioning haemoglobin, which has an affinity for carbon monoxide 300 times greater than for oxygen, and is converted to carboxyhaemoglobin. The body tissues become characteristically cherry-red in colour. A sample of diluted blood from a case of carbon monoxide poisoning remains pink as compared with the normal blood similarly diluted, which has a yellow colour. The spectrum of carboxyhaemoglobin is evident if the concentration is greater than 40%. Respiration fails at least 10 to 20 minutes before the circulation ceases, and, as the combination of carbon monoxide and haemoglobin is reversible and no other toxic effects occur, rescue and treatment should be instituted without a moment's delay.

Rescue and Treatment

If called upon to enter a gas-filled room it is essential that proper precautions should be taken:

(1) Shut off the source of gas, if possible, but do not waste time looking for taps.

(2) Open all doors and windows.

(3) Take two or three deep breaths, then hold the breath as long as possible while rescuing the patient.

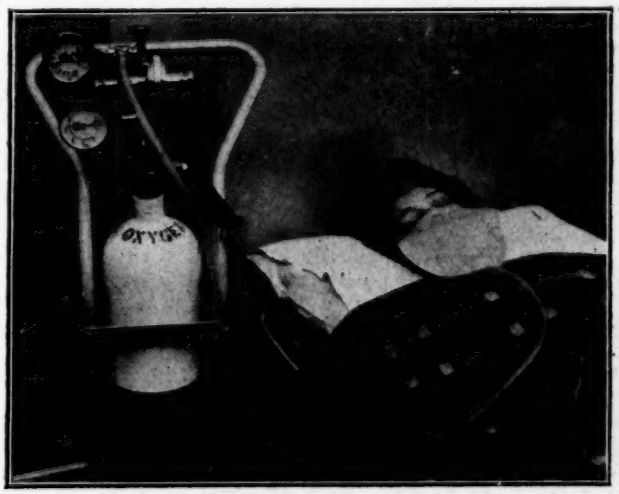
(4) Crouch if coal-gas is present, as this is lighter than air, but there is no point in doing this if carbon monoxide from other sources is present, as it is about the same weight and mixes thoroughly with air.

(5) A life-line should be attached to the rescuer, who should drag the patient out.

In some circumstances it may be necessary to obtain a proper breathing apparatus from the fire brigade or police before entry is possible. A wet handkerchief across the nose only prevents irritation from smoke and does not afford any protection from carbon monoxide. The normal civil defence or service respirators are not effective against carbon monoxide.

As soon as the patient is out of the dangerous atmosphere clear his mouth, pull his tongue forward, and swab his throat if necessary. If breathing has ceased, begin artificial respiration, using the Holger Nielsen method. Keep the patient warm with blankets and hot-water bottles, and administer oxygen, as soon as available, through a face-mask as shown in the illustration. It should be presumed that shallow, difficult breathing or loss of consciousness, with or without cyanosis, following gassing accidents indicates an interference with pulmonary ventilation which can be ameliorated by oxygen. Oxygen will pass through the alveoli into the blood at twice the normal rate if the concentration is doubled in the inspired air. A flow of 3–6 litres a minute is usually adequate.

The prompt use of artificial respiration and the administration of oxygen are by far the most important principles of treatment. A number of analeptics or stimulants of the central nervous system can be given, and it is now generally agreed that the following are effective to some extent and may be employed properly in emergency: injection of



[1] Report of the Standing Interdepartmental Committee on Accidents in the Home. H.M.S.O., London. 1953.
[2] Simpson, K. (1954). *British Medical Journal*, **2**, 774.

picrotoxin (*B.P.*), 3 mg. in 1 ml. intravenously; injection of leptazol (*B.P.*), 100 mg. in 1 ml. intravenously; or injection of nikethamide (*B.P.*), 4 ml. intramuscularly.

The patient may be violent during the period of recovery, but should not be allowed to walk, and should be persuaded to rest for at least a day. The headache can be relieved by rest and oxygen, but aspirin and similar drugs should not be given; morphine and barbiturates are contraindicated. Venesection should be carried out only if there is marked engorgement or pulsation of the jugular veins.

Lung Irritants

Ammonia is occasionally a source of accidental gassing from its use as a solution in enclosed spaces. *Chlorine* has been generated and caused accidents by the combination of sodium bisulphite ("harpic") and hypochlorites ("chloros") when the use of one of these materials for cleaning has immediately followed the other. Prior to 1938 refrigerators contained ammonia and sulphur dioxide, but nowadays dichloro- difluoro- methane, which is nontoxic, is generally used.

The lung irritants produce immediate irritation of the upper respiratory tract and also much discomfort in the chest and throat. In mild cases the face is congested, and coughing painful and continuous; in more severe cases there may be respiratory embarrassment with distended cervical veins and cyanosis. Bronchial spasm is a feature, and medium rhonchi and rales are heard on auscultation of the chest. Recovery is usually rapid, and, although bronchitis may ensue, serious chest complications are unusual.

The essentials of treatment are rest and oxygen. The patient should be carried to a pure warm atmosphere, the clothing loosened and removed if contaminated. Coughing can be suppressed by encouragement and reassurance and by drinks of hot sweet tea or coffee. Dyspnoea or cyanosis can be relieved by oxygen. In cases with marked irritation of the upper respiratory tract, inhalation of steam from a quart (1.1 litres) of hot water containing two teaspoonfuls of compound tincture of benzoin *B.P.* (friars' balsam) is of benefit. It is not desirable to give morphine or atropine, and venesection should be performed only if there is embarrassment of the right side of the heart. Leptazol or nikethamide may be given as described under carbon monoxide poisoning.

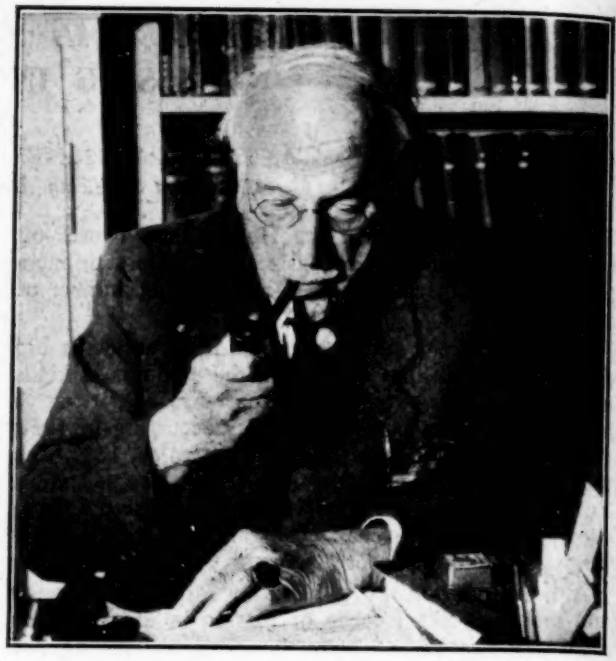
Centrally Acting Poisons

Volatile solvents such as *trichlorethylene* and *carbon tetrachloride* are used for the cleaning of clothes, and the latter is also used in fire appliances. Exposure causes intoxication, followed by drowsiness, loss of consciousness, and respiratory failure. The vapours are usually heavy, and both the rescuer and patient should be removed from the floor as quickly as possible. Trichlorethylene is decomposed at red heat and lung-irritant gases are produced; it is not safe to smoke in or near its vapour. Carbon tetrachloride may produce symptoms of an "acute abdomen" with abdominal pain and vomiting. Later, tenderness in the loins develops and the urine is scanty and contains red blood cells. The after-effects of exposure to carbon tetrachloride are potentially serious—liver and renal damage occur—and the patient should be admitted to hospital.

Methyl chloride is a colourless liquid with an ethereal and sweetish smell and has been used as a refrigerant. In addition to narcosis it can produce convulsions and oliguria. *Methyl bromide* is a colourless gas with a vapour three to four times heavier than air. It has been used in fire extinguishers, and exposure to the vapour may produce burns of the skin and respiratory passages.

The treatment of casualties from these substances is absolute rest, and it is most important that no patient should be allowed to undergo exertion or resume work for 24 hours, even though apparently only slightly affected. Artificial respiration, oxygen, and analeptics are employed as for carbon monoxide.

Next article on Emergencies in General Practice.—"Acute Alcoholic Poisoning," by Dr. J. A. Imrie.



[*A.T.P., Zurich*

CARL GUSTAVE JUNG AT 80

[FROM A SPECIAL CORRESPONDENT]

Professor C. G. JUNG, the distinguished Swiss psychiatrist, was born in Switzerland on July 26, 1875. His eightieth birthday has been honoured in many countries and he has had greetings from all over the world. In Zurich, where Jung has lived for so many years, the event was marked, in Swiss fashion, by a reception in the morning and by a dinner in the evening. This happy arrangement made it possible for all the visitors—numbering hundreds—to meet Professor Jung and his wife. Amongst the guests from Switzerland (in addition to the staff of the C. G. Jung-Institute and the Zurich Analytical Psychology Club) were Professor W. KUHN, the Rector of Basle University; Professor W. BOVEN, Rector of Lausanne University; Professor T. WYRSCH, University of Berne; Professor ROCHEDIEU, Geneva University; Professor MANFRED BLEULER, Zurich University; Dr. A. L. VISCHER, representing the Swiss Academy of Medical Sciences; Professor W. PAULI, of Zurich, and Professor TH. REICHSTEIN, of Basle, two distinguished recipients of the Nobel Prize; Dr. jur. EMIL LANDOLT, the Mayor of Zurich; Professor E. ABEGG, Professor H. HEDIGER, Professor A. KELLER, all of Zurich; also Professor QUISPEL, Utrecht, Professor H.-CH. PUECH, Paris. Guests from the United States included Dr. VIOLET DE LASZLO and Mr. FOWLER MCCORMICK; from England came Miss RUTH BAILEY and Drs. E. A. BENNET, MICHAEL FORDHAM, F. O'D. FINIGAN, and FRANCES SMART. A *Festschrift* in two volumes, containing essays written specially by former pupils and admirers of Jung, was presented to him at the reception.

Jung comes of an old Swiss family: his grandfather, a physician of note, held the chair of medicine at Basle. He—like his grandson later—was a pioneer in the treatment of mental illness, and he set aside beds in the town hospital for psychiatric patients. This was the nucleus of the now well-known psychiatric clinic at Basle. Jung's father, a parson, in addition to other duties, was the chaplain to the town hospital, and he, too, had a special interest in the sick in mind. It is not surprising, then, that C. G. Jung, even as a medical student, paid close attention to the workings of the human mind.

The philosophy of Kant and his successors fascinated him. But it gave few clues about mental sickness. The introduction to a work on psychiatry by Kraaft-Ebbing gave Jung the key he sought, and there and then he decided

to be a psychiatrist and, as he put it, to discover the intruders of the mind. Consequently he joined the staff of Eugen Bleuler at the Burgholzli Hospital in Zurich. In those days the Burgholzli established itself as one of the noted hospitals in Europe—a position it still holds. With Bleuler's backing Jung was soon busy with clinical and research work, particularly into the psychological meaning of the symptoms in dementia praecox. The comprehensive research methods employed amounted to a fourfold approach, for they were a combination of Galton's word-association test, the psychogalvanometer response, and readings of the respiratory and heart rate. Jung must have been one of the first clinicians in psychiatry to appreciate the importance of the physiological accompaniments of emotion. His name became widely known as a result of his work. Further, it led to his meeting with Freud, for it gave experimental proof to Freud's theory of repression. Bleuler and Jung were the first psychiatrists of established standing to recognize the value of Freud's work, and Freud, in those days, gladly acknowledged his indebtedness to them.

Jung's book on *The Psychology of the Unconscious* and his volume on *Psychological Types* marked him as an original thinker with all the attributes of the pioneer. He avoided the dogmatic formulations, so popular in the nineteenth century, holding—as he does to-day—that psychiatry is by no means a finished structure. Jung's publications make a library in themselves, and another book has just come from the press. Herr Max Rascher, the head of the well-known firm of publishers, with the true Swiss sensitivity for an occasion, presented Jung with the first copy of his new work, *Mysterium Coniunctionis*.

Jung is fit and well. A remarkable fact is that he and his wife, their five children, nineteen grandchildren, and two great-grandchildren are all in sound health. There has been no break in this wonderful family—long may this continue !

ROYAL MEDICAL BENEVOLENT FUND

The annual general meeting of the Royal Medical Benevolent Fund was held at the house of the Medical Society of London on July 28. In the absence of Lord Webb-Johnson, the President, who is recovering from an accident, Mr. R. M. HANDFIELD-JONES was voted to the chair. The honorary officers—namely, Lord Webb-Johnson as president, Mr. F. A. Juler as treasurer, and Dr. R. Cove-Smith as secretary—were unanimously re-elected, as were the retiring members of the committee of management, together with two new members, Mr. R. H. Boggon and Dr. W. D. W. Brooks.

In presenting the financial statement for 1954 Mr. F. A. JULER said that the accumulated funds now stood at £488,150, a satisfactory increase of £6,000 on last year's total. The value of investments had increased by £9,000. The amount distributed in charities was £44,741, an increase of £3,753 on the previous year, and the costs of administration were only £4,513. He thought this relation of ten to one a very satisfactory feature of the Fund.

Sir ZACHARY COPE, in moving the adoption of the report, said that the figures were most encouraging.

Dr. COVE-SMITH said that last year once again the Fund gave away more in grants and payments than the actual income received during the year. The excess of expenditure over income was £2,232, and the legacies received, though more numerous than usual, amounted to a smaller total sum. To cover the deficiency it was necessary to transfer some money from the capital account, and it was gratifying to feel that, owing to judicious investment in the past, the accumulated funds were substantial and formed a firm foundation for the purpose of the work.

More Subscribers Wanted

An analysis of the reasonably substantial income of close on £49,000, and of the accumulated capital now amounting to nearly half a million, showed that it came mainly along a few very definite channels, and not from the whole body of the profession. It might be expected that the rank and file of the profession would be only too anxious to support more fully their own Benevolent Fund; yet at present this was not so. First of all the committee of management desired to pay tribute to the generosity of the Medical Insurance Agency, which, by its substantial covenants, benefited the Fund by over £10,000 last year, and to all the other subscribers who had entered into seven-year covenants, thereby nearly doubling the value of their subscriptions to the Fund. Then there were the legacies, and finally the regular yearly subscriptions collected by the British Medical Association which were earmarked for the Fund, and in addition the special donations voted by the B.M.A. Charities Trust Fund from non-earmarked subscriptions, and the annual subscriptions from medical societies and local medical committees.

These regular and recurrent sources of income were of inestimable value, but the committee would feel happier still if a large number of new covenant subscribers could be added each year from the many individual members of the profession who did not as yet contribute. Such subscriptions could be looked upon as a contribution for the benefit of their fellows or as a thank-offering for their own present freedom from major misfortune. Dr. Cove-Smith concluded by begging each subscriber to try to enlist another during the year.

Appeals only to Medical Profession

Mr. HANDFIELD-JONES, from the chair, voiced the thanks of the Fund to a number of people, first of all the B.M.A. Charities Committee Trust Fund. The R.M.B.F. was always grateful for the energy with which that body pursued its task of collection. Next he thanked the Medical Insurance Agency. He had never managed to understand how, year after year, that body appeared in the role of the goose laying the golden eggs, but its activities, as Dr. Cove-Smith had said, enriched the Fund last year by £10,000. They were grateful also to the medical press, which gave them always the publicity they desired. He wished to stress the fact, which was not always appreciated, that the Fund never appealed outside the medical profession. It had never asked for, or received as a result of asking, subscriptions or donations from other than medical men. If such money had been given, it had been given willingly and voluntarily without any appeal on the part of the Fund. He went on to mention the Ladies Guild, an integral part of the Fund's organization, and carrying on a special type of work which only women can do. Finally, he thanked the honorary auditors, Messrs. Deloitte, Plender, Griffiths, and Co., and the honorary solicitor, Mr. A. L. Underwood, for much valuable service.

Nova et Vetera

DISCOVERY OF THE PULMONARY CIRCULATION

The sad life of Michael Servetus was among the old forgotten far-off things that are perhaps best left forgotten. To recall it was painful not only because of his dreadful end, but also for the yet more dreadful state of mind of the man who compassed it. The prophet warned us long ago that "The heart is above all things desperately wicked," and the translators of the Authorized Version of the Bible with their genius of psychological insight render as *wicked* a word which, in the original, is more literally *sick*. Laws and lawyers notwithstanding, we doctors will consider a man sick who, having written to a friend in 1546, "I [Calvin] will not pledge my faith to him [Servetus], for did he come, had I any authority here [Geneva], I should not suffer him to go away alive," and nine years later, when Servetus did come, did not suffer him to go away alive. That murder

can dwell in a man's mind for nine years is surely evidence of mental sickness, the only reasonable and merciful verdict on him and his like. We have been forced to grow used to such things of late and would wish only that they were yet further off, for they have become very much closer than the four centuries that separate us from Servetus and Calvin.

In our issue of January 23, 1954, p. 209, we reviewed Professor O'Malley's *Michael Servetus, A Translation of His Geographical, Medical, and Astrological Writings* (1953). This quatercentenary year has elicited several other works on Servetus. Important among them is that by Professor Fulton, who provides, in most conveniently arranged form, a bibliographical survey of everything that Servetus wrote.* The book is valuable for its critical review of the history of the discovery of the pulmonary circulation. With this discovery Servetus must certainly be credited, pending evidence to the contrary and despite the now well-known reference in a thirteenth-century Arabic writer. The whole subject, proverbially confused, is admirably clarified by Professor Fulton. Perhaps the best way to give an idea of his conclusions is to set out in chronological order the events with which he is concerned.

1536(?)–1538(?) Servetus anatomical demonstrator to Guenther in Paris, perhaps with Vesalius.

1541 Guenther couples the names of Servetus and Vesalius as his two anatomical assistants.

1543 Vesalius's *Fabrica*, published at Basel, does not mention Servetus or pulmonary circulation.

1546 Servetus describes pulmonary circulation in an MS.

1553 Servetus publishes *Christianismi restitutio* at Lyons. It contains a description of the pulmonary circulation.

1555 Servetus burnt at Geneva.

1556 The Spaniard Juan Valverde, pupil of Colombo, in a Spanish work printed in Rome, plagiarized Vesalius but describes pulmonary circulation based (?) on Servetus. He does not cite him.

1559 The Italian Realdo Colombo in a book published at Venice shortly after his death, and written some years earlier, describes pulmonary circulation based (?) on Servetus. He does not cite him.

1616 Harvey's MS. lecture notes contain first mention of circulation as a whole but do not cite Servetus.

1628 Harvey's *De motu cordis*, published at Frankfort, does not cite Servetus.

1694 Wotton's *Reflexions on Ancient and Modern Learning*, published in London, contains first public English citation of Servetus and the pulmonary circulation.

1706 The philosopher Leibnitz mentions the Servetus discovery in a letter.

1723 *Christianismi restitutio* reprinted, in large part, in London but burnt by order of the bishop. Only proof sheets survive.

1790 Near-facsimile reprinted at Nuremberg.

Michael Servetus was a theological reformer, scholar, geographer, astrologist, lawyer, mathematician, and physician, and he is usually regarded as the spiritual founder of the Unitarian movement. It cannot be denied that he was violent and fanatical, abusive and intemperate in debate. He was conspicuous for these qualities even in an age in which they were common literary forms. It also cannot be denied that he was a martyr for what he believed to be true. But what he believed, both as to the working of the body in the circulation and as to the nature of the soul, depend, in their ultimate analysis, on the interpretation of a very small number of words, and particularly on the Greek word *pneuma*. That word does, in fact, mean quite different things in the original texts on which he dwelt, and varies also according to the state of physical and physiological knowledge of the time. It is thus not very far from true to say that Servetus died for a single word, and that, for a single word, Calvin took a human life. And it was a word which neither understood or could understand aright.

CHARLES SINGER.

**Michael Servetus Humanist and Martyr.* By John F. Fulton. Bibliography of works and census of known copies by Madeline E. Stanton. (Pp. 98; illustrated. $8.50.) New York: Herbert Reichner. 1953.

Correspondence

Because of the present high cost of producing the Journal, and the great pressure on our space, correspondents are asked to keep their letters short.

The Integration of Medicine

SIR,—Sir Harold Himsworth's thoughtful Linacre Lecture (*Journal*, July 23, p. 217) was concerned mainly with diagnosis and less with therapy. He sees British medicine as queasy to-day and likely to be sick to-morrow unless radical changes are made in its organization. There is a growing lack of integration between medicine and its fundamental sciences which has arisen because too few clinicians have been adequately educated in a basic science and too few scientists have received a medical training. The clinicians see their problems but haven't acquired the techniques which would solve them, while the scientists have the skill but lack an intimate acquaintance with disease. No one is so well placed as Sir Harold to analyse these defects in our system, and we must be grateful for his brilliant analysis.

The remedies are, I believe, simple, and only money is needed to apply them. The money has to be invested in men and not in research programmes. The first is the provision of "fellowships" to train young clinicians in the basic sciences. A three-year course with a Ph.D. at the end of it for 20 men annually will require 60 "fellowships" remunerated at £1,500 a year. Six weeks ago I was taken round the Massachusetts Institute of Technology by a young paediatrician who had just completed such a three-year course and was about to return to his work at the Boston Children's Hospital. He had devised an improved method for the production of the thyrotropic hormone. There are many like him in the States, but has he one British counterpart?

The re-entry of such young men into clinical work must be guaranteed. (We have already lost several good young men to the United States and Canada. This is a harsh comment on our present system: medical brains in this country are not so numerous that we can afford to export them.) This will require the provision of associate professorships in clinical research, salaried, let us say, at £2,000 a year. Such associates will be attached to professorial or specialist units, and, in order that they can maintain a clinical competence and a continued contact with sick subjects, should be in charge of the ward service for three months each year. The professor, who has to be master of four trades, would then have a little leisure for thought and research.

Such schemes would cost £500,000 a year; no more than a trivial investment in preventive and therapeutic medicine. The National Health Service has made a good beginning, but it has not yet begun to accept its responsibility for the advancement of medical science. It should not be difficult to persuade Mr. Macleod to steal Sir David Eccles's thunder. —I am, etc.,

Derby. DOUGLAS HUBBLE.

Anaemia in the Tropics

SIR,—The *Journal* of May 28 has just arrived here, and we have read with great interest Professor A. W. Woodruff's Goulstonian Lecture (p. 1297) on the "Natural History of Anaemia Associated with Protein Malnutrition."

During the past four months we have been investigating the anaemias on the tea estates in the Brahmaputra Valley of Assam. The climate of this region is very hot and damp during the months of April to October and very cool and dry during the three or four months of winter. The patients we investigated were all workers on the tea estates and an extremely uniform group culturally, economically, and

socially. Through the courtesy of the Ross Institute and the Jorehaut Tea Company we were able to collect anaemic patients with Hb below 6 g.% and some below 2 g.% and retain them in hospital for periods of three months or more. During this period they were under our complete control, and full weekly blood studies and serial sternal punctures were done, the results of which will be published later.

The anaemia present in this valley during the hot, damp summer is similar to that which we have investigated in Portuguese East Africa and the coastal regions of Kenya, and is very different to that described by Woodruff in West Africa. These differences pose interesting problems of considerable importance.

None of the anaemias which we have seen here had any liver involvement and very few had enlarged spleens. The patients were men and women, both pregnant and lactating as well as non-pregnant, between the ages of 16 and 35 years, straightforward uncomplicated anaemias of a very severe type such as have been known in this region for many years. They were collected from the tea gardens while still at work. With the exception of one case in 55 they were all microcytic hypochromic iron deficient with M.C.V. between 45 μ^3 and 80 μ^3 with M.C.H. and M.C.H.C. between 12 $\gamma\gamma$ and 20 $\gamma\gamma$ and 18% to 22% respectively. Their marrows all had a typical erythro-normoblastic picture, sometimes with giant stab cells; a few cases had intermediate megaloblasts. Their total serum proteins were within normal limits, but frequently the albumin–globulin ratio was reversed, the albumin fraction being at the lower limit of normality or below. Gastric acidity after histamine was normal in most cases, as was the indirect van den Bergh reaction. The majority of these anaemias responded to oral iron in doses of 15 to 20 or 30 gr. (1 to 1.3 to 2 g.) daily given in the form of ferrous sulphate for 5 to 10 weeks. They did not respond to lower doses given for shorter periods. Their response to intravenous iron was no better than to oral. Nor was there any difference in the severity of the anaemia, or response to treatment in men, non-pregnant, pregnant, and lactating women. The birth of the child sometimes resulted in a somewhat more rapid response and sometimes not, indicating that pregnancy is not the only factor concerned in this anaemia. During the course of treatment the M.C.V. in all cases rose from the original low level to between 110 μ^3 and 150 μ^3 with reticulocytes never above 5%. This rise in the M.C.V. during the course of treatment is of considerable interest, since it indicates that macrocytosis is not an index of megaloblastosis and that all the microcytic hypochromic anaemias pass through this macrocytic stage during treatment—hence the importance of sternal puncture for their proper diagnosis and treatment.

It will be seen that these anaemias differ from those investigated by Professor Woodruff in West Africa in that they had no enlarged liver and responded to iron treatment, as was to be expected from their low M.C.H. and M.C.H.C.

Although we have done no critical survey, the diets of these tea-garden workers do not appear to be faulty; in fact they are a good deal better than that of the Macedonian peasantry before the war. Nor would there seem to be any deficiency of iron in the diet. We are therefore doubtful whether nutrition is an important factor in their genesis and maintenance. This anaemia is extremely common in all the hot, damp regions of tropical Africa and India, and its aetiology has not been precisely established. We agree with Professor Woodruff that intestinal parasites are not likely to be an important factor, and malaria is no longer a menace on the majority of the tea estates.

The incidence of these hypochromic iron deficient anaemias is decidedly lower and response to iron treatment more rapid in the cooler parts of the year, and in places of higher altitude. For example, on the hot, damp coast of Kenya this is the predominant anaemia, but in the cooler highlands it gives place to the megaloblastic hyperchromic type, the incidence of which has also been shown to be seasonal.[1] The common denominator in all the areas where these iron-deficient anaemias are so abundant is great heat and humidity; variations in diet and the incidence of intestinal parasites do not show any close correlation. Although, of course, more than one factor may be involved, it seems that iron loss through excessive perspiration may be the most important. Work is proceeding on this question and will be published separately. Nitrogen loss in the perspiration has also been shown to be excessive under such conditions, and this may be a factor in the protein situation.[2]

As a result of our work we have been able to divide these hypochromic microcytic iron deficient anaemias of the damp, hot Tropics into the following groups: (1) Those with erythro-normoblastic marrows and normal albumin: this group responds adequately to iron unless they develop giant stab cells or their albumin falls during the course of treatment. (2) Erythro-normoblastic marrows but low serum albumin: this group responds partially to oral iron but needs albumin supplements in the form of skimmed milk to bring them to their normal blood values. (3) Giant stab cells in their marrows but normal albumin: this group responds partially to oral iron but needs 25 mg. to 40 mg. of folic acid for complete response. (4) Those with giant stab cells and low albumin go up partially on iron but need both proteins and folic acid to produce normal blood picture; they do not go up with albumin alone, folic acid alone, or iron alone. (5) Those with megaloblastic marrows which do not go up with iron or B_{12} and folic acid but do so with folic acid and iron. (6) Cases with erythro-normoblastic marrows which respond partially to iron, then develop the giant stab cells and/or low albumin and then require the treatment outlined above.

We are aware that these giant stab cells occur in other conditions than anaemia, but their presence in the anaemias that fail to respond to iron or proteins, their appearance in those that are having improper treatment, and their disappearance when folic acid is given all seem to indicate that they have some significance in anaemic conditions.

These microcytic iron deficiency anaemias of the Tropics and subtropics are far more complicated and more prevalent than are the hyperchromic megaloblastic, and there appears to be no one single factor either in their aetiology or treatment that can be regarded as paramount.—We are, etc.,

HENRY FOY.
ATHENA KONDI.
B. SARMA.

Assam, India.

REFERENCES

1 Foy, H., *et al.*, *Lancet*, 1955. In press.
2 Patwardhan, V. N., *Nutrition in India*, 1952. Bombay.

Resuscitation in Asphyxia Neonatorum

SIR,—Dr. Bryan M. Hibbard (*Journal*, July 16, p. 183) describes the case of an infant who, after being resuscitated from severe post-natal asphyxia, subsequently had symptoms of severe injury to the brain, and at 12 months evidence of gross mental retardation with epilepsy. Dr. Hibbard asks how long an infant can sustain anoxia and subsequently show normal development; he refers to the case reported by Holmes and Payne in the *British Medical Journal*[1] in which the infant recovered following prolonged endotracheal oxygen, and questions whether such prolonged efforts at resuscitation are justified.

I write to inform you that the child whose case was reported by Dr. Holmes and myself has subsequently been followed up by Dr. D. G. Leys at Farnborough Hospital, and at 18 months this child's progress is in every respect normal. This case, then, is evidence of the fact that the newborn child may sustain a period of 20 minutes' anoxia without apparent damage to the brain. It is of course possible that this child may later show some evidence of having suffered injury, but normal progress to the age of 18 months would ordinarily be taken as strong indication to the contrary.—I am, etc.,

J. A. PAYNE.

Maidstone, Kent.

REFERENCE

1 Holmes, J. A., and Payne, J. A., *British Medical Journal*, 1955, **1**, 1071.

Drowning

SIR,—I was most interested in Dr. K. W. Donald's valuable paper on "Drowning" (*Journal*, July 16, p. 155). In discussing the care during recovery, he advises that the patient should be placed on his side, and indicates that this is of value in diminishing the risk of regurgitation and aspiration of stomach contents. The side on which the patient should lie is, however, not specified.

In radiological practice it is a common procedure, during barium meal examinations, to turn the patient on to his or her right side in order to test for gastro-oesophageal reflux. In this position, fluid in the stomach usually tends to overlap the cardia, and, if this becomes incompetent, to pass back into the oesophagus by gravity. The anatomical features are illustrated in the postero-anterior radiograph (Fig. 1) taken during a barium meal examination with the

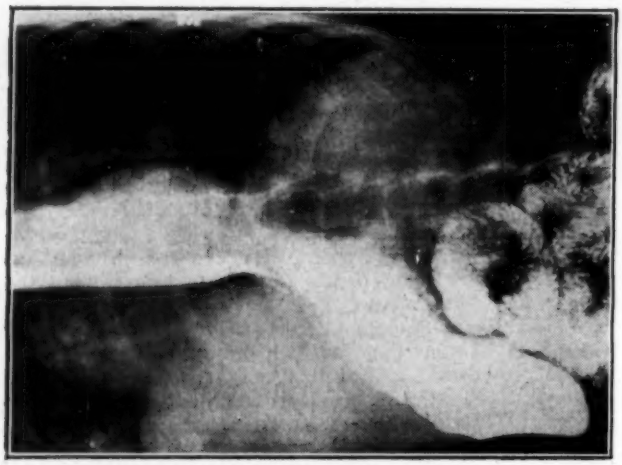


FIG. 1.—Patient lying on his right side.

FIG. 2.—Patient lying on his left side.

patient lying on his right side. There was no incompetence of the cardia in this patient, but the position of the oesophagus has been demonstrated by additional swallowed barium, and it is shown to enter the "under surface" of the stomach below the fluid level. When, however, the patient was turned on to his left side (Fig. 2) the fluid level in the stomach can be seen to lie below the plane of the oesophagus.

In view of these anatomical considerations, an unconscious patient would seem to have a better chance of avoiding regurgitation if he is placed on his left side.—I am, etc.,

Liverpool, 15. G. ANSELL.

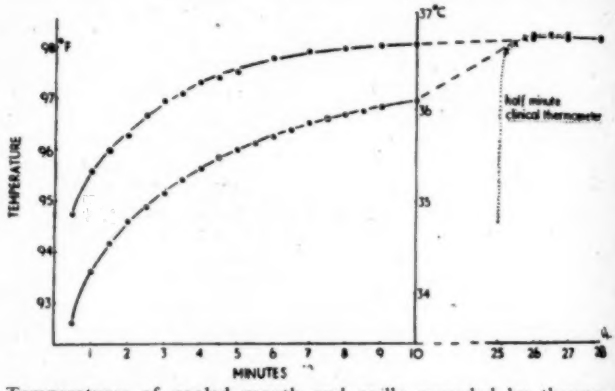
SIR,—There must be many doctors, animal lovers, who, whilst acquiescing in the necessity for a certain amount of animal experimentation, yet do so with a good deal of mental reservation. The article on drowning by Dr. K. W. Donald (*Journal*, July 16, p. 155) will, one may imagine, make many of them bristle with indignation. Is the wholesale and deliberate drowning of animals justified merely to prove—in the interests of physiology forsooth—that the submerging of an animal in water beyond a certain time is incompatible with life? In one paragraph it is stated that 160 dogs (100%) died as a result of one series of experiments, whether an attempt was made to resuscitate them or not, all of which savours of insensate and useless cruelty. More experiments of a similar kind are called for by the author of this humane article.—I am, etc.,

Brighton. G. L. DAVIES.

"Half-minute" Thermometers

SIR,—We have been stimulated by recent correspondence on the subject of clinical thermometers to investigate two aspects of temperature measurements: (1) The time taken for a "half-minute" clinical thermometer to reach the temperature of the tissues when the latter has become steady. (2) The time taken for the tissues of the mouth or axilla to reach a maximum temperature after a degree of cooling such as could be reasonably expected preceding a clinical temperature measurement. Two thermometers have been used: a standard "half-minute" clinical mercury thermometer and a copper-constantan thermocouple which had a low thermal inertia and gave a steady reading accurate to 0.1° F. (0.05° C.) within 15 seconds of contact with the tissues.

In the first experiment the mouth was closed and the temperature under the tongue was measured with the thermocouple thermometer until a constant reading was obtained. The mercury thermometer was then inserted



Temperatures of cooled mouth and axilla recorded by thermocouple thermometer. Note axillary and mouth temperatures are equal after approximately 25 minutes. "Half-minute" mercury thermometer inserted into mouth at 25 minutes reaches mouth's steady temperature within one minute. ●——● Mouth; O——O axilla.

under the tongue. At 30 seconds the mercury thermometer recorded a temperature within 0.3° F. (0.15° C.) of the mouth temperature as recorded previously by the thermocouple. On different occasions 75–90 seconds elapsed between the insertion of the mercury thermometer and the attainment of a maximum reading.

After the mouth had been cooled by the air currents caused by speaking for half to one minute, and was then closed, its temperature reached the maximum after 10 or more minutes when measured by either thermometer (see Figure). This indicated that the time lag in temperature measurement depends more on slow tissue warming than on the properties of the thermometer. The temperature of the well-closed axilla rose more slowly and reached a maximum in 20 to 30 minutes. On the four occasions when comparison was made this maximum axillary temperature was equal to the maximum mouth temperature and only 0.5° F. (0.25° C.) below rectal temperature.

The observations, made on two healthy adult males under equable conditions, are in reasonable agreement. The results of the experiments shown in the Figure are representative of several trials. Some differences were found in the rate

of rise of tissue temperature; this is determined partially by the local blood flow, which is influenced by many factors and may show large physiological variations; thus the rate of rise of tissue temperature may be expected to vary from one experiment to the next. Our results lead us to conclude that if an accurate estimate of "body temperature" is required the thermometer must remain in the chosen site until a constant reading is obtained. This may take more than 10 minutes in the mouth and as long as half an hour in the axilla. Rectal temperature, which is affected less by moderate environmental influences, may be recorded accurately in a much shorter time.

The Figure illustrates how difficult it may be to observe the slight changes which occur when a clinical thermometer is employed and inspected at half-minute intervals. It can be seen that during the sixth half-minute after insertion a rise of about 0.3° F. (0.15° C.) occurs, but during the thirteenth period a rise of less than 0.1° F. (0.05° C.) takes place; later the corresponding temperature change is further diminished and may not be noticed. It may be worth drawing attention to the difficulty of defining "body temperature": any record of temperature indicates only that of the site at which the thermometer is placed. Also normal variation in tissue temperature is so large that no average figure can be given in health.[1] The standard textbooks on clinical methods[2] and those on nursing technique which we have consulted do not, in our opinion, place due emphasis upon the possibilities of appreciable error which our results demonstrate.

It may be concluded that the significance which can be attached to clinical temperature measurements depends upon the observer's awareness of the slow thermal behaviour of the tissues and their normal temperature variations rather than upon the vagaries of the "half-minute" thermometer.—We are, etc.,

F. B. BESWICK.
P. COLE.

Manchester, 13.

REFERENCES

[1] Du Bois, E. F., *Fever and the Regulation of Body Temperature*, 1948, p. 3. C. C. Thomas, Springfield, U.S.A.

Physique of Children

SIR,—As Dr. J. N. Mills says (*Journal*, July 23, p. 265), relationships established between physique and intellectual performance would be of great interest and importance. Both for this reason and because research in constitutional anthropology has in the past suffered nearly to the point of discredit from claims and systems unsupported by exact scientific experiment, modern work in this field must be, as far as is humanly possible, above criticism, statistical or otherwise. I am accordingly grateful to Dr. Mills for drawing attention to a misuse of statistical methods by Dr. R. W. Parnell *et al.* (*Journal*, June 25, p. 1506) which must have been recognized by a number of readers of the *Journal*.

There is, however, a further criticism, more of principle than method, that I think must be met before Dr. Parnell's claims of a relationship between body build and intelligence test results in 11-year-old children can be regarded as established. A number of studies have shown that there is a significant though not a close relationship between intelligence test results and developmental age.[1] Thus girls of 11 who have begun their adolescent spurt in growth would be expected to score slightly higher than girls who had not. There is also a small relation between gross body size and test results at any age, which probably comes partly or wholly from the same cause. It is not clear how far the body build categories used by Dr. Parnell are independent of gross body size and of developmental age, and it seems to me that both these variables must be accounted for before any claims for a relationship with body build *per se* can be entertained.

Nevertheless, Dr. Parnell and his associates have put us greatly in their debt by amassing a very interesting series of data, which it is much to be hoped will be published in a more extended form, suitable for direct statistical treatment of the body measurements themselves. They are also to be congratulated on their admirably scientific restraint in refusing to refer to somatotype components in dealing with 11-year-olds and recognizing explicitly that until we have followed a series of children up to maturity we lack the necessary criteria for somatotyping individuals below the age of 16 or 17.—I am, etc.,

J. M. TANNER.

London, W.14.

REFERENCE

[1] Tanner, J. M., *Growth at Adolescence*, 1955, p. 141. Blackwell Scientific Publications, Oxford.

Antibiotic-induced Staphylococcal Enterocolitis

SIR,—The letter from Dr. P. D. Hooper (*Journal*, July 9, p. 141) must be the most remarkable publication on this subject to date. Staphylococcal enteritis without staphylococci is Hamlet without the Prince indeed. Dr. Hooper admits that there was an "absence of direct evidence" on which to base his diagnosis. So far as I can see, there was not a shred of evidence of any kind. It is usually accepted that in such cases the stools are teeming with antibiotic-resistant staphylococci. Dr. Hooper found none, either before or after death. What he did find, according to his account, was an undiagnosed suppurative bronchopneumonia which surely may have had something to do with the rapid deterioration in the condition of his patient.

It seems a little strange to blame the chlortetracycline for what happened, since none had been given for four days before the collapse, and during this time the patient had remained well. Nor is it easy to accept the statement that the *Staphylococcus aureus* from the lung was "sensitive to all antibiotics except chlortetracycline," in view of the fact that there is known to be cross-resistance between the three members of the tetracycline group of antibiotics.

The case history is therefore against both the diagnosis of staphylococcal enteritis and the suggestion that the complications were a result of antibiotic therapy.—I am, etc.,

JOHN R. WILSON.

London, S.W.19.

Comforters

SIR,—I was interested to read Dr. Nigel Swallow's observations on thumb-sucking, associated with the simultaneous holding of a piece of fabric (*Journal*, July 23, p. 266).

My late partner, J. H. Badcock, published similar observations many years ago; he, however, claimed that the material was always of a woolly or fluffy nature, such as a blanket or woollen garment, and that the child tended to rub or "paw" it. He put forward the suggestion that it might be an evolutionary act deriving from a remote period when the dam had a hairy chest, and drawing the parallel of the kitten which massages its mother's breast when suckling. This is possibly a far-fetched conception but ingenious.—I am, etc.,

N. J. AINSWORTH.

London, W.1.

SIR,—As a doctor, over 20 years in practice with municipal infant welfare as a sideline, I would hesitate to be dogmatic on the subject of comforters; but as a father of five I feel peculiarly competent to express an opinion.

My first sucked his thumb and twirled his hair, and though now happily married he still threatens to revert to habit in moments of stress and is doubtless restrained by the thumb's deformity. My second inserted three fingers and rapidly developed dreadful adenoids and an absurd affection for a small satin-edged blanket along which she ran the fingers of her free hand backwards and forwards, and without which she would not go to sleep. My third was given a dummy whenever she showed the slightest tendency to suck any part of her anatomy, but never just to stop her crying. The dummy was removed as soon as she had gone to sleep, and within a month or so it was no longer necessary. The same method was adopted with the fourth and fifth with the same satisfactory result. None of them have any of the deformities or bad habits attributed to the use of the dummy, which will be no dirtier than the parents, and, if still needed after three months, suggests that something is very wrong either with them or the baby. I had similar good results with more intelligent patients and their infants.

but it is a losing battle when fighting the whole flock, for there is bitter opposition from welfare nurses, mothers-in-law, grandmothers, and anyone else who gets an opportunity to express an opinion. The opinions appear to originate from sources, very high, very anonymous, and very vague, and are held with almost religious fervour.

Surely all serious objections arose from excessive and unduly prolonged use of the dummy in the days when ignorance and ill-balanced diets produced miserable babies. Nowadays it is no longer needed as a soother but is by far the best and easiest method of preventing the development of thumb-sucking and other fantastic aberrations. If there is any serious objection to the method I describe I should like to hear of it. Any deformity is out of the question, while the aesthetic objectors might reasonably become ascetic for the short time involved.—I am, etc.,

Deal. G. DONAL MCGRATH.

Confirmatory Test for Colour Blindness

SIR,—Railway medical officers and medical examiners of transport services may be interested to know of a test I have employed for many years in conjunction with the use of pseudo-isochromatic test charts (Ishihara-modification of Stilling's test) for colour defectives. I have found it particularly helpful when dealing with (1) illiterates, (2) those with a low I.Q., (3) those who feign incomprehension, knowing that they are colour defective, and (4) malingerers. The test consists of first presenting the charts in varying sequence and noting the answers. A medium red glass is then placed before each eye and the examinee is asked to read the charts again, in the same or different sequence. The red glass has the effect of rendering the charts in monochrome with the figures or letters standing out pale against a dark background or dark against a pale background. The illiterate and the individual with the low I.Q. find it easy to trace the figures, while the colour defective, wise to his defect, and the malingerer will either not answer or give replies that are inconsistent.

The examinee must not be allowed, of course, to peer over the red glass once it is placed before his eyes. This test is the practical application of an observation which is mentioned in the book on *Colour Blindness* by Dr. M. Collins.[1]—I am, etc.,

Bombay, India. C. H. H. ROBERTSON.

REFERENCE

[1] Collins, M., *Colour Blindness*, 1925, p. 60. Kegan Paul.

Prevention of Stasis in Trauma of the Ankle Joint

SIR,—I did not see your issue of June 25 until now, as I have been abroad, but I hope that I am not too late to comment on the letter from Mr. S. P. Barnard, of Southsea (p. 1532). I was very interested that he had recently "experimented" on the ideal material of a professional football club; in the details of his treatment, which includes a U-shaped pad; and in his emphasis on "auto-massage," to increase the rate of recovery.

It all goes to show that there is nothing new under the sun, for, faced with a similar pressing need amongst university athletes in the 'twenties, I modified the late Frank Romer's method of immediate strapping support and natural function. My own contributions were the addition of an under-layer of "elastoplast" which prevented breach of the skin surface over the tendo achillis and the instep, and a poroplastic U-shaped pad round the lateral malleolus. Long afterwards, in 1934, this was published in my "Treatment of Athletic Injuries" which appeared under "Modern Treatment in General Practice" in the *Medical Press and Circular*.[1]

In 1939, in an article on sprains, etc., of the wrist and ankle, I illustrated this method by diagrams showing the U-pad, and stated: "As the damage is nearly always most marked at the fibular attachment of the anterior fasciculus of the external lateral ligament, a U-shaped poroplastic pad is usefully applied round the external malleolus. . . . Great care must be exercised in moulding each strip of adhesive plaster round the joint and in securing exactly the right amount of pressure. . . . The patient is particularly directed to walk as naturally as possible, otherwise the massaging effect of such movement is lost."

Again, in the *Medical Press and Circular*, Symposium No. 4 on "Athletic Injuries," in 1937, I wrote[3] that "benefits of immediate firm support and natural function" included: "(A) (iii) Increasingly active movements, by alternately pressing and relaxing under the strapping, furnish natural (and, incidentally, free) massage, which enormously hastens reduction of swelling." This was reprinted in the *Cambridge University Medical Society Magazine* of Michaelmas, 1953, in "Progress in 30 Years of Sports Injuries at Cambridge."

It is clear that in similar circumstances, nearly 30 years apart, Mr. Barnard and I have arrived independently at exactly the same conclusions, and I am now prepared to believe that similar ideas germinated amongst those responsible for tending the injuries of the athletes of ancient Greece and the gladiators of Rome; and that Hippocrates himself must be gently smiling.—I am, etc.,

Cambridge. R. SALISBURY WOODS.

REFERENCES

[1] Woods, R. S., *Med. Press*, 1934, **189**, 458.
[2] —— *Practitioner*, 1939, **142**, 278.
[3] —— *Med. Press*, 1937, **195**, Symposium No. 4, i.

Glycosuria in Elderly Workers

SIR,—Your report of Dr. R. D. Appleford's communication to the Section of Occupational Medicine at Toronto on the incidence of unsuspected diabetes in older workers (*Journal*, July 9, p. 135) prompts me to record the following.

The firm for whom I act as medical officer has recently instituted medical examinations at age 65 for those whose services it is desired to retain, provided they are fit. We have now conducted 48 examinations, and previously undiagnosed glycosuria was found in no fewer than seven instances. As five of the cases came to light in the first seven examinations, I was just as surprised as was Dr. Appleford's audience and carefully checked the reagents. The men examined were not wholly unselected, as those who, to the lay eye, were visibly failing were excluded. Had they been included the figure might well have been higher. One man who was advised to retire as he also suffered from emphysema with commencing cardiac failure refused further investigation, but the other six were referred through their general practitioners to a diabetic clinic. Dr. G. F. Walker, consultant physician to the clinic, informs me that only one case had a true diabetic blood sugar curve, and that of a mild type.

I reported my experience to a recent meeting of the Association of Industrial Medical Officers, but as men aged 65, being past the age of life insurance, do not usually have their urine examined in the absence of symptoms, this may account for the fact that no discussion ensued. The findings suggest that a small sugar leak may be part of the ageing process and account for some loss of efficiency, and it would seem that the matter is worthy of further investigation by those who have opportunity to examine numbers of presumably healthy men of the older age groups. The matter is of practical and economic importance, as all six cases were controlled by simple dietetic measures.—I am, etc.,

Peterborough. WM. MARSHALL.

Glycogen Storage Disease of the Liver

SIR,—I have read with interest the annotation on "Glycogen Storage Disease of the Liver" (*Journal*, July 16, p. 189). I note, however, the statement, "The glycogen itself appears to be normal in structure . . .", and I wish to draw your attention to two recent communications[1] [2] which show that certain glycogen samples from glycogen-storage diseased livers have abnormal structures.—I am, etc.,

Edinburgh, 9. D. J. MANNERS.

REFERENCES

[1] Illingworth, B., and Cori, G. T., *J. biol. Chem.*, 1952, **199**, 653.
[2] Manners, D. J., *J. chem. Soc.*, 1954, October, p. 3527.

Forceps Delivery Under Local Analgesia

SIR,—I was most interested in the paper by Mr. J. M. Gate and Mr. W. A. W. Dutton (*Journal*, July 9, p. 99) on the use of local analgesia for forceps delivery. As they say, the danger of aspiration of vomit is abolished, and the obstetrician who finds, on examination under local analgesia, that the prerequisites for forceps delivery are not fully satisfied, does not feel compelled to make the attempt, as may be the case if a general anaesthetic has been given. There is also the advantage of a reduced danger of post-partum haemorrhage, particularly in domiciliary work, where post-partum haemorrhage has a high incidence after delivery under general anaesthesia.

In the hope that the method may gain wider acceptance in domiciliary practice, I wish to suggest that the technical difficulties of its use in the home, pointed out by your contributors, can largely be overcome by the use of 2% lignocaine instead of 0.5% procaine. The "spread" of lignocaine is such that satisfactory anaesthesia is obtained by infiltrating the vulva more or less in the manner described by your contributors, but without attempting to reach the pudendal nerve, lying deeply in Alcock's canal. Thus the lumbar puncture needle is unnecessary and a No. 1 hypodermic needle can be used. A 10-ml. syringe, pre-sterilized by boiling, can be kept in a spirit-proof case with this needle attached, and 1 oz. (28 ml.) of 2% lignocaine is usually more than sufficient. 10 ml. of this solution, infiltrated into each side of the vulva, gives a total dose of 0.4 g., less than half the permissible maximum of 1 g., and a further 10 ml. can be used if necessary. It is usual to advocate 0.5% solutions for vulval infiltration, but I have found 2% lignocaine to be satisfactory, and it takes up less space in the midwifery bag. In the small number of cases in which I have had the opportunity to use lignocaine in this way, analgesia has been sufficient for insertion of the whole hand, and for subsequent forceps delivery; and, to my surprise at the time, proved sufficient for rotation of the only occipito-transverse head so far encountered.

The technique is simple, very little apparatus is required, and there is no delay while an anaesthetist is found. The advantages are great, including that of having burnt no boats by given an anaesthetic, and the method appears to me to be the ideal one for domiciliary practice.—I am, etc.,

Hucclecote, Glos. IVOR COOKSON.

SIR,—I read the article by Drs. J. M. Gate and W. A. W. Dutton (*Journal*, July 9, p. 99) with avidity; theirs is an excellent series. I have just one observation to make. I think they use too much weak procaine—almost 3 oz. (85 ml.). I have used up to 20 ml. of 1% successfully doing this type of delivery. I am strongly in favour of this method achieving popularity in domiciliary work. The days of "tricky" midwifery on district are over.—I am, etc.,

Liverpool, 17. M. JOSEPH MCKENNA.

Alcohol and Epilepsy

SIR,—Reviewing last year's *Journal* for papers on epilepsy, I re-read Dr. Eric C. O. Jewesbury's article "Some Clinical Epileptic Oddities" (*Journal*, December 25, 1954, p. 1518). I consider it a valuable contribution to the knowledge of epileptic manifestations other than classical seizures. However, I cannot agree with the author's explanation that fluid retention seemed to increase a patient's liability to both fits and jerks. One of the fits had occurred after drinking a good deal of beer the previous night, and he had also noticed that myoclonic jerks occurred especially after beer drinking. Although it is well known that hydraemia following intake of large amounts of fluid may constitute a precipitating factor in epileptics, in the above-mentioned case it was not an indifferent fluid, but an alcoholic beverage that was taken. I think that alcohol must be considered an even more potent precipitating factor than large amounts of fluids. Seizures following abuse of alcohol occur usually on the following day, a fact mentioned in the excellent work on *Epilepsy and the Functional Anatomy of the Human Brain*, by Penfield and Jasper.[1] I dare say that since the general use of modern anti-epileptic drugs the importance of dietetic measures and especially the complete avoidance of alcohol have been underestimated and neglected, not only in the literature but also in the prescriptions given to the patients.—I am, etc.,

Brandon, Manitoba, Canada. MILO TYNDEL.

REFERENCE

1 Penfield, W., and Jasper, H., *Epilepsy and the Functional Anatomy of the Human Brain*, 1954. London.

Rauwolfia Serpentina in Psoriasis

SIR,—I was most interested in reading the findings of Dr. G. Leslie about the beneficial effect of rauwolfia serpentina extracts in the treatment of psoriasis (*Journal*, June 11, p. 1428). We have been interested in this problem for the last two years and have reported our results.[1–3] These are in complete agreement with those of Dr. Leslie and they have been confirmed since by Dr. Victor Panaccio.[4] —I am, etc.,

Montreal, Canada. JACQUES GENEST.

REFERENCES

1 Genest, J., *Canad. med. Ass. J.*, 1954, **71**, adv. 73.
2 —— Ibid., 1955, **72**, 490.
3 —— *Un. méd. Can.*, 1954, **83**, 915.
4 Panaccio, V., ibid., 1955, **84**, 669.

"The Changing Face of Medicine"

SIR,—Dr. Clifford Kennedy writes of "two years in the Services, when the mind of the doctor, so far as things medical are concerned, might in the average case be a complete vacuum" (*Journal*, April 30, p. 1045).

From the humble viewpoint of a junior medical officer serving in the Royal Army Medical Corps this statement seems to me to be most unjust, not only to the Corps but to that body of National Service medical officers who play such a vital part in Service medicine.

The practice of medicine in the Services, more perhaps than in any other branch of our profession, can only provide clinical interest and experience if the individual himself is willing to seek it. How often in Service life do we see medical officers literally counting the days or even hours till their two years are finished? With such a preconceived idea about Army life being a "vacuum" is it to be wondered that these M.O.s damn their chances from the start—to the detriment of their patients, the Corps, and themselves? Such a vacuum is in many cases the individual's own making, and I see no reason to attach blame to the Corps for this lack of initiative shown by some of the junior members, who, I agree, would probably need far more than a postgraduate course to refresh themselves.

We are, as doctors in the Services, in a relatively unique position so far as National Service is concerned, inasmuch as we can still follow our chosen profession. We still deal with patients, whether they be fit young men trying to get off some unpleasant duty by "going sick" or, in fact, seriously ill children in a families' station. Both can present problems equally difficult in diagnosis. Admittedly we do work under difficulties at times, but I know of no better satisfaction than the knowledge of responsibility for the successful outcome of a case well conducted in spite of these.

I have purposely refrained from writing too much concerning my own experience in this so-called vacuum. It is true to say, however, that I have had far more responsibility in all branches of my chosen specialty, far more widening of my general outlook on medicine by foreign travel (one does not begin to appreciate how good English medicine is till one leaves the precincts of hospital or general practice work at home), and far more opportunity both in time and material for personal study than I found in civilian practice. Furthermore, advanced postgraduate study is possible in the Corps with better opportunities afterwards than in many branches of civilian life—if, again, one is prepared to seek them and not expect everything to come one's way without working for it.

Too much would appear to be taken for granted concerning the work being done by young M.O.s in the Services, who for perhaps the first time find themselves in positions of considerable responsibility and by their own skill and determination can gain a high reputation for the Service doctor.

It is a pity that such work should be judged on the efforts of others who, unable to grasp advantages given to them, spend their time crossing off yet another day, till for them, and them alone, their vacuum existence will be over.—I am, etc.,

Cyprus. D. R. M. O'SULLIVAN.

"Over-the-counter" Spectacles

SIR,—This letter is little more than an echo of Dr. W. S. Inman's (*Journal*, July 23, p. 267), but I should like to support his contention that "over-the-counter" glasses should not be condemned. When persons dependent for a living on the correction of hypermetropia or presbyopia break their glasses an "over-the-counter" pair may be a godsend; it may enable them to carry on when they would otherwise have to stop work for perhaps a month. Naturally, if there is considerable astigmatism, such glasses will afford little help; and if the wearer chooses a pair much too weak or much too strong, which is unlikely, it will cause inconvenience or discomfort, but that is very different from permanent damage. In fact, during 44 years of practice as an ophthalmic surgeon I have never known of any lasting harm from wearing wrong glasses. Many years ago Sir George Berry, an ophthalmic surgeon of great experience, made a similar statement in Parliament.

It is easy to *imagine* that incorrect glasses do harm, especially where there is a pecuniary advantage in thinking so, and, as ophthalmic surgeons, it behoves us to beware of this snag. I once had a one-eyed patient for whom a bifocal lens had been prescribed by an optician—unwisely, I think, for she was not sure-footed. She told me that ever since trying them on she had seen "flashes of light and balls of fire" in that eye, and wanted to sue the optician for damages. Truly there is no limit to the things which some people will father on to a supposed cause.—I am, etc.,

Birmingham, 3. D. PRIESTLEY SMITH.

SIR,—I am extremely glad to see Dr. W. S. Inman's letter (*Journal*, July 23, p. 267). These glasses have been a boon to many, and I hope that they soon will become generally available again.

I myself have several pre-war pairs which I keep in various places and use when I forget or mislay my regular glasses. I also lend them out to friends in a similar predicament.—I am, etc.,

Beckenham, Kent. W. MAXWELL PENNY.

Survival in Cancer

SIR,—The letter of Drs. James W. Ellis and George Linden (*Journal*, July 16, p. 200) commenting on our paper, "Early Cancer Detection and Education: A Pilot Trial" (*Journal*, March 12, p. 627), does well to bring out an important point that is only recently beginning to receive full emphasis, and we are in full sympathy with their general thesis. A stage 1 case treated in 1947 survives till 1953: an identical case is untreated till 1952 (in stage 4) and also survives till 1953. Our own point is simply this—who is to say, in 1947, whether the case is going to die in 1953, 1963, or 1973?

Our present-day knowledge leads us to infer an increased probability of longer survival with early treatment. Our paper emphasizes the necessary cautions needed in assessing this probability, and shows that we are under no illusions as to the deficiency of current evidence. Meanwhile the sentences of our article quoted by your correspondents seem to us as reasonable a statement as we can make at the moment. But Drs. Ellis and Linden are surely right in asking for more realistic interpretation of survival rates and more data on the natural history of cancer.—We are, etc.,

Sheffield, 10. J. WALTER.
E. C. ATKINSON.

Diagnosis of Salmonella Infections

SIR,—Having been concerned during the last year or so with the bacteriological and serological diagnosis of fair numbers of salmonella infections, we have been impressed and somewhat concerned with certain difficulties which have arisen. This particularly applies to infection with *S. typhi*.

We feel it may be a help if we point out how important it is for general practitioners to submit specimens for blood culture, a Widal reaction, and culture of stool before administering antibiotics. Not only do these drugs in many instances sterilize the blood and stools, but also there is some evidence that they alter the Widal reaction, thereby making it difficult to interpret. This has certainly been our experience in cases of typhoid fever treated with chloramphenicol.—We are, etc.,

KENNETH FROOME.
Scarborough. J. P. S. WHITEHEAD.

Toxicity of Phenylbutazone

SIR,—Dr. T. N. Fraser is neither fair nor logical in his condemnation of phenylbutazone (*Journal*, May 28, p. 1318). It has always been recognized to be a potentially dangerous drug in sensitive patients when used in large doses. Nevertheless it is a godsend to the 90% or so of rheumatoid patients who tolerate it well (every patient is warned of the possibility of the harmful effects of the drug and is given a printed list of the early toxic symptoms). In my experience the patient who is going to respond to phenylbutazone will do so on very small doses (100 mg. morning and night). There is nothing to be gained and a great deal of risk involved in giving larger doses. As soon as the rheumatoid condition appears to be under control I reduce the dose to 100 mg. daily, which can be continued with safety year in and year out if necessary. I have asked the manufacturers to put out a 50-mg. tablet, which I think would probably be an adequate daily maintenance dose in most rheumatoids once they are back at work.—I am, etc.,

London, S.W.16. HARRIS AVERY.

Cost of Treatment

SIR,—Mr. J. A. Rodgers states (*Journal*, July 9, p. 140) that he is under the impression that the profession as a whole understands that the pharmaceutical industry cannot quote prices on literature which is sent all over the world. I, for one, find this difficult to understand, in view of the veritable bombardment of literature from his firm which has reached me since November last. The penicillin manufacturers seem to manage to keep us informed of prices, and I see that many advertisements in the *Journal* give us an idea as to the cost of the goods.

Recently, after asking his representative the price of "terramycin," I remarked that it was expensive. The reply to this was that his was a cheaper method of treatment than paying 15 guineas a week for a hospital bed for the patient who failed to respond to penicillin. I do not in the least doubt that the actual price of the drug is fair and honest, but I should like to put it on record that I consider this a most dangerous teaching. Surely if it is a question of taking a shot in the dark with a "wide spectrum" antibiotic it is high time that the patient was in hospital anyway. After my inquiry as to costs I was assured by the firm's representa-

tive that "there is no secret about the price," and this was confirmed by the fact that he gave me a useful price list of all his company's medical products.—I am, etc.,

London, N.22 J. V. LAVERICK.

Right to Hospital Treatment

SIR,—The medico-legal report (*Journal*, July 9, p. 145) of the case of an injured motor-cyclist is of interest to all concerned in providing efficient hospitals. Mr. Justice Pilcher is reported to have said that "through paying a weekly sum everybody had a right to hospital treatment." It is not clear in what form the payment is made. Many people still have the impression that a nation-wide service is secured by stamping a card each week.

Is there a possibility that His Lordship's statement may be interpreted in such a way as to perpetuate this misunderstanding? Must we not all realize that such valuable contributions as those of general practitioners and of hospitals can be maintained only by considerable support and even sacrifice on the part of the community?—I am, etc.,

Bangor. LEONARD LANCASTER.

POINTS FROM LETTERS

Doctors' Prayer Circle

Dr. D. H. C. GIVEN (202, Muswell Hill Road, London, N.10) writes: For the past ten days I have been attending an international conference of doctors, clergy, and laymen who had been called together for a joint study and discussion on the subject of divine healing. It is a subject that concerns all of us, doctors, clergy, and laymen alike, and its objective is simply the wholeness of man, body and soul. I have come home with the urgent conviction that even I from retirement must do something about it . . . The object of this communication is to initiate if possible a doctor's prayer circle to meet for weekly prayer and discussion in my house or anywhere else selected, for the purpose of advancing the common objective of doctors and clergy, that man should advance to the wholeness that God intended for him. Would those interested please get in touch with me.

Black Hairy Tongue

Dr. C. L. BAKER (Bletchley) writes: In an answer to a question on this subject recently ("Any Questions?" *Journal*, April 9, p. 924) the spontaneous occurrence of this condition was mentioned. A case I have seen recently, in a man who gave a history of sucking proprietary lozenges for two years in order to alleviate a cough, cleared dramatically when he developed a severe pharyngitis due to a haemolytic streptococcal infection. Presumably the normal flora had been rapidly re-established in the mouth, but I hesitate to think that this method could be used therapeutically, at least with these particular bacteria.

Dental Health

Mr. E. LINE (Birmingham, 29) writes: In 1953, 1,500 sets of full dentures were supplied to people under 21, and 30% of all full dentures supplied went to people under 35. These figures are steadily increasing. It is difficult to alter national habits, and in a free country one cannot dictate to the population too much on the topic of diet. Even so, sooner or later, we shall have to make a stand over the pernicious habit of imbibing sugars and starches *ad lib.* between meals. Public dental services must cost the State about £600,000 each week, not to mention loss of productive time by patients and the cost to the hospital services in dealing with the more serious end-results of dental neglect. One wonders if it is logical to expect improvement unless we dentists seek the whole-hearted co-operation of the medical profession in our attack on dental caries.

Acute Anxiety and Hysteria

Dr. A. E. BLACKBURN (Beckenham, Kent) writes: With reference to the article by Dr. G. Garmany in which he defines hysteria (*Journal*, July 9, p. 115), it may better be described as a condition in which ideation governs function. Sir William Gull gave the name "anorexia nervosa" to a condition of asthenia where appetite and the sensation of hunger are absent and there is aversion to all food. The condition has to be diagnosed from malignant disease. There is never a suggestion of self-destruction unless the person is insane.

Obituary

Sir ARCHIBALD COLLINS, D.S.O., *M.C.*, M.B. F.R.A.C.P.

Sir Archibald Collins, whose death on June 24 at the age of 65 we have already briefly noted, was President of the Federal Council of the British Medical Association in Australia. His career as a consulting physician and his leadership in the profession were remarkable for high achievement. For some 25 years he had participated in Association affairs, but most actively during the past seven years, comprising, first, the period of possible nationalization of the medical profession, and then of the establishment of Australia's National Health Service. Throughout this time he displayed a statesmanlike skill in negotiation, and contributed notably to the development of the present scheme, which combines the principles of voluntary self-insurance and State subsidy.

Archibald John Collins was born at Lismore, New South Wales. His father, James P. Collins, a Canadian, was an M.A. of the University of Toronto. Archibald Collins was educated at Fort Street School, Sydney, where he gave ample proof of aptitude for learning and for leadership. Having been dux of the school, he entered the faculty of medicine at the University of Sydney in 1908, and in 1913 graduated M.B. with first-class honours. Though awarded the Walter and Eliza Hall travelling scholarship for medical research in 1914, he elected to serve as a resident medical officer in the Royal Prince Alfred Hospital, Sydney, as by doing so he would be free to answer the call of duty. Enlisting in the Australian Imperial Forces in 1915, he served in France, where gallant conduct in the field gained him the D.S.O. and the *M.C.*, while he was several times mentioned in dispatches. After the war he was again invited to join the staff of the Royal Prince Alfred Hospital, and from 1920 to 1923 he was superintendent.

He then began practice as a consulting physician, continuing in that career till his death. He became assistant physician to the Royal Prince Alfred Hospital in 1923, physician in 1934, consulting physician in 1950; and he was a member of the board of directors from 1935 until his death. Other posts held were those of consulting physician to the Royal Australian Navy and to the Hornsby District Hospital. He was a foundation Fellow of the Royal Australasian College of Physicians. Among the many posts in the University of Sydney he held was that of lecturer in therapeutics and clinical medicine. From 1935 to 1954 he was a member of the university senate. As lecturer and teacher he had the capacity both to impart knowledge and to interest the student in the subject. He did much for the advancement of medical education and science in Australia.

To the policy and business of the British Medical Association Sir Archibald made an outstanding contribution through his wise counsel, administrative ability, and command of both detail and general policy. Joining the Association in 1918, he was a member of the Council of the New South Wales Branch from 1930 till his death. He was president of the Branch in 1934–5; vice-president in 1948; honorary secretary from 1937 to 1948; and Branch representative on the Federal Council in 1937 and from 1945 till his death. He represented the Federal Council in 1948 at the inaugural meeting of the British Commonwealth Medical Conference in London, and at Geneva at the second General

Assembly of the World Medical Association. In 1951 he was elected President of the Federal Council and only a short time before his death had been re-elected to the office. During his long membership, but mostly in the often controversial issues of the past ten years, he firmly influenced the policy of the British Medical Association in Australia. To his leadership he brought remarkable qualities, as a man eminent in his profession, experienced in affairs, and skilful in exposition and in debate.

For many years he was an honorary director and consulting physician of the Australian Red Cross Society, New South Wales Division. In connexion with the Federal Government's National Health Service, he was chairman of both the statutory Pharmaceutical Benefits and the Federal Pensioner Medical Advisory Committees. He was created a knight bachelor in January this year for distinctive leadership in the medical profession. At the time of his death he was president of the Australasian Medical Congress, Ninth Session, which is to be held in Sydney later this month. Though he had had several coronary attacks in recent months, Sir Archibald gave his usual devotion and energy, until his death, to his many activities. His career was of high achievement, his life enriched by friendships. He was happy in his marriage, and much sympathy will be felt, in Great Britain as well as in Australia, for Lady Collins and her two sons.

T. L. LINDSAY SANDES, O.B.E., M.D. F.R.C.S., F.R.C.S.I.

The death of Mr. T. L. Lindsay Sandes on June 25 at his home at Claremont, Capetown, has removed one who not only attained a high degree of skill as a surgeon but one who was deservedly popular both in South Africa, his adopted country, and in the British Isles.

Thomas Lewis Lindsay Sandes was born at Dublin in 1882 and was educated at Trinity College, Dublin, where he graduated M.B., B.Ch. in 1903, gaining the gold medal in medicine and surgery. He proceeded to the M.D. three years later. After holding the usual house appointments he became clinical assistant to Sir Victor Horsley at the National Hospital, Queen Square, London. Later he acted as assistant to Professor E. T. Kocher in the University of Berne.

In 1909 Lindsay Sandes became research pathologist and bacteriologist to the South African Government, an appointment he held until 1911. In the following year he decided to establish himself in practice as a surgeon in South Africa, but on the outbreak of the first world war he immediately joined the South African Medical Corps. He served in France and England until 1920, attaining the rank of lieutenant-colonel. He was appointed O.B.E. for his war services as surgeon in charge of the surgical division of the South African Hospital, Richmond, and as surgical specialist to the Wynberg Military Hospital. Elected F.R.C.S.I. in 1918, he obtained the diploma of Fellow of the Royal College of Surgeons of England two years later. He returned to civilian life as a surgeon, practising in Capetown and making his home at near-by Claremont. In due course he was appointed lecturer in clinical surgery in the University of Capetown, and he was also surgical adviser to the Military Pensions Board.

Lindsay Sandes played a leading part in the medical affairs of the Union. He was secretary of the South African Medical Congress held in Capetown in 1924, and he served on the old South African Committee of the B.M.A. in the days before the amalgamation in 1927 of the South African Branches of the Association and the South African Medical Association under the title of the Medical Association of South Africa (British Medical Association). He was the first vice-president of the new Association and from 1932 to 1938 its president. As chairman of the Head Office and Journal Committee he was for many years closely concerned with the management of the *Journal of the Medical Association of South Africa (B.M.A.)*—now called the *South African Medical Journal*. In 1939 he became the fourth recipient of the gold medal of the Medical Association of South Africa (B.M.A.), an award which received enthusiastic approval throughout the profession in the Union. He returned to the British Isles in 1927 as representative of the Cape Western Branch at the Annual Representative Meeting held at Edinburgh in that year and in 1933 to attend the Annual Meeting of the B.M.A. at Dublin. When plans were being made for the new hospital at Groote Schuur, Rondebosch, he was appointed secretary of the medical committee and later served on the staff of the hospital. He was for some time a member of the South African Medical and Dental Council. In 1935 he was awarded the King George V Jubilee medal. A man of culture and great charm, Lindsay Sandes was loved by all who knew him, and South Africa in general and Capetown in particular are the poorer for his passing.

CHARLES DONALD, O.B.E., Ch.M., F.R.C.S.

The obituary of Mr. Charles Donald was printed in the *Journal* of July 23 (p. 267). Mr. JAMES A. ROSS writes:

The untimely death of Mr. Charles Donald comes as a severe personal loss, not only to his own colleagues and students in the London hospitals where he worked in civilian life, but also to those who were privileged to know him in the second world war when he served as consulting surgeon in North Africa, Sicily, and Italy. Colonel Donald's presence was a great encouragement to the surgeons working in the forward areas. His charming unassuming manner always put his juniors at their ease, and he brought us a breath of that academic life from which we were temporarily exiled. His visits made the isolated surgical specialist feel that he was not forgotten, and it was a fillip to morale to know that a surgical spokesman of Colonel Donald's calibre was watching over the interests of our specialty at headquarters. Charles Donald, like W. J. Eastwood, was a great man. Their example was an inspiration to those who worked under them, and their service to the Eighth Army is not forgotten.

Dr. DAVID CLOW died at his home at Cheltenham on July 16 at the age of 84. David Clow was born at Kelso on May 24, 1871, and was educated at Edinburgh University, where he graduated M.B., Ch.B. in 1897. He then held the appointment of resident surgeon at Leith Hospital, and subsequently was in practice at Kirkcaldy and North Berwick before settling at Bradford in 1901. It was from Bradford that he entered the R.A.M.C. to serve in the first world war. While stationed in Malta, he met Dr. Alice Sanderson, who was attached to the R.A.M.C. When the war ended they were married and Dr. Clow joined his wife in her practice at Cheltenham. A member of the British Medical Association for 58 years, he represented the Gloucestershire Branch at all the Annual Representative Meetings held from 1925 to 1942 and was president of the Branch in 1932–3. During the second world war he was secretary of the local protection of practices committee. A student of literature and a lover of music, he added to the gaiety of the suppers which followed meetings of the Gloucestershire Branch, and his rendering of Scottish songs and his recitations will long be remembered by his old friends. Always proud of his Scottish origin, he was president of the Cheltenham Scottish Society twenty years ago.

when his fellow-Scot, Mr. W. S. Morrison, now Speaker of the House of Commons, was his guest. Dr. Clow is survived by his widow and two daughters.

J. R. C. writes: The Gloucestershire Branch of the B.M.A. owes much to Dr. David Clow for all the hard work he carried through on its behalf, but even more impressive was his personality. Deeds are more potent than words, and David Clow, loyal to his friends, straight in all things, kindly and skilful to his patients, set an example of the best in our tradition of medicine and raised our professional repute in society. Fortunate are those who were for a time his close associates.

Medical Notes in Parliament

Tuberculosis Incidence Among Immigrants

Dr. BARNET STROSS (Stoke-on-Trent, Central, Lab.) asked the Minister of Health on July 25 whether he was aware of the high incidence of pleural effusion and progressive primary tuberculosis lesions in young Irish girls who immigrate to Britain, and who are free from tuberculosis on entry; and what action he proposed to give them protection against this disease.

Mr. IAIN MACLEOD, Minister of Health, said that he was aware of certain studies which had been made on these subjects, but no comprehensive statistical information was available about the condition of immigrants on entry or about the time of infection. Nor could such information be obtained without the imposition of fresh restrictions and controls out of proportion to the danger to public health. The same protective, preventive, and treatment services were available to these as to other residents in this country.

Dr. STROSS said that the answer was not good enough in reality. The problem increased with the increasing number of people entering, not only from Ireland but from the West Indies and Africa, who came from agrarian areas and were negative reactors, and had no immunity from tuberculosis when they entered this country. Would the Minister at least ask the Irish Ministry of Health to assist in seeing that they were skin-tested or given B.C.G. vaccine treatment before coming here? If many did not then receive that treatment, would he ensure that they were given it when they arrived? Mr. MACLEOD said he agreed that there was a problem, but not with all that Dr. Stross had said. He was advised about two years ago that the figures revealed by an inquiry did not indicate a serious menace to the health of this country. If there was anything useful he could do with the Irish authorities he would do it, and he would consider Dr. Stross's suggestion. He added that he was sure the Eire authorities were deeply concerned about this matter.

He also informed Dr. Stross that 2,568 beds were allocated for the treatment of pulmonary tuberculosis in the North-west Metropolitan Region. Dr. STROSS said the number of those beds occupied by Irish immigrants was more than the total of all beds occupied by all other foreigners. Mr. MACLEOD said that Dr. Stross was better informed than he.

Health Check Impractical

Dr. STROSS raised the subject again in a short debate on July 27. He said that the number of Irish immigrants was possibly 20,000 a year, and the number from the West Indies about 10,000. Most of the Irish immigrants were females, and the great majority were in the 15–25 age group. About half were negative reactors. He was told that in the past five years 1,300 immigrants had returned to Eire and entered sanatoria there. It was significant that the death rate from tuberculosis per 100,000 in Liverpool and Glasgow, where many of the Irish went, was 57 and 72.7, whereas in Leeds and Bristol it was 37 and 38.

He suggested that there should be a committee of representatives, principally medical, from both countries, established by the Ministry of Health. It should consider means of preventing tuberculosis in migrants, and means of early detection and treatment. There should be effective liaison between the medical services of Britain and Ireland, with particular regard to the exchange of case records and *x*-rays. The British part should be primarily supervision of the health of the migrants.

Miss PAT HORNSBY-SMITH, the Parliamentary Secretary, pointed out that far fewer cases were being recorded, in spite of better methods of detection; facilities for treatment were more widely available; and the preventive services were in an increasingly better position to take vigorous and effective action. In all these measures the immigrants shared. This country had been more cautious in its approach to B.C.G. vaccination than some others, and the Medical Research Council was conducting widespread investigations into the long-term protection it gave. Some two years ago the Central Health Services Council was attracted by the idea of action to ensure that people from abroad seeking work here should be free from the disease. The matter was referred to the Standing Tuberculosis Advisory Committee, which expressed the view that there was no serious menace to the health of the country and that the number of immigrants entering with active tuberculosis was very small.

The problem was of particular concern to the North-west Metropolitan Region, because the survey showed that a quarter of the cases discovered in the survey were in their area. Most were citizens of the Commonwealth or of the Republic of Ireland, over whose entry there was no statutory control. Any measures to implement a health check would involve legislation. Even to check the small number of foreigners would mean a new medical check at 61 ports, apart from the difficulty of deciding what evidence should be acceptable as a medical record of freedom from the disease. It was not thought that a permanent committee was necessary, because there was already close liaison between the officers of the Ministry and the Republic of Ireland. The best method was that a local authority which had this concentration of immigrants should deploy its mass radiography units to seek out the danger spots.

Reciprocal Health Services

Sir FRANK MEDLICOTT (Norfolk, Central, National Lib. and Con.) asked the Minister of Health on July 25 what proposals he had for providing financial assistance for British subjects who had occasion to receive medical or hospital treatment when visiting foreign countries with whom no reciprocal arrangements existed complementary to the British Health Service.

Mr. MACLEOD replied that it was the Government's policy wherever possible to negotiate reciprocal arrangements with foreign countries in respect of social services, including medical care; but it would not be practicable to refund directly the cost of medical treatment received abroad by people normally living in this country.

Sir FRANK MEDLICOTT asked what discussions were taking place with the United States Government with a view to reciprocal arrangements being made for the provision of medical or hospital treatment for British subjects visiting the United States of America.

Mr. MACLEOD said there were none, since the health services of the United States did not offer any suitable common basis for reciprocal arrangements. Sir F. MEDLICOTT said that it was a little out of balance that a large number of American visitors received these advantages, whereas the smaller number of British visitors to America did not have comparable facilities. Mr. MACLEOD replied that if one was to have reciprocal arrangements one must have something to be reciprocal with. Medical and hospital treatment in the United States was on a private footing. While that remained it was difficult to do anything.

Deputation on Heroin

Mr. RICHARD WOOD (Bridlington, Con.) asked the Home Secretary on July 26 whether he had met a deputation from

the British Medical Association to discuss his decision to prohibit the manufacture of heroin. Major G. LLOYD-GEORGE stated that with the Secretary of State for Scotland and the Minister of Health he was considering the representations made by the deputation from the British Medical Association when he received them on July 11.

Helicopters to Hospital

Mr. J. GRIMOND (Orkney and Zetland, Lib.) asked the Secretary of State for Scotland for a statement on his discussions with the First Lord of the Admiralty about the use of Naval helicopters for emergency medical cases in Scotland.

Mr. J. STUART stated on July 28 that, while the Navy could not be responsible for providing a comprehensive ambulance service by helicopter, the First Lord had agreed that the Naval helicopters based at Lossiemouth might, in exceptional circumstances, subject to Naval requirements and to weather conditions, be used to carry to hospital seriously ill patients for whom no other kind of quick transport was practicable. Requests for assistance would be made to the commanding officer, R.N. Air Station, Lossiemouth, through the senior administrative medical officers of regional hospital boards. General practitioners in the areas likely to be concerned were being advised accordingly.

Tuberculosis in the Navy

Commander A. NOBLE, Parliamentary Secretary to the Admiralty, told Mr. J. Dugdale (West Bromwich, Lab.) that preparation of the next edition of *The Health of the Navy* was well advanced, but he could not give yet the probable date of publication. Mr. DUGDALE asked him to confirm or deny published reports on what were thought to be extracts from the document that the health of the Navy was not all that it should be, and in particular that there was a heavy incidence of tuberculosis. Commander NOBLE said that there was not a lot of tuberculosis in the Navy. The figure was 0.2%. That might seem high in comparison with others owing to the importance that was attached to regular and universal examination.

Medical Decisions in R.A.F.

The controversy which has continued over several weeks about the standards of physical fitness for National Service, and to which the release or rejection of well-known sporting personalities from England cricketers to motor-racing drivers has given rise to much heated comment, culminated in a debate on the day Parliament rose for the summer recess on July 28.

The subject was raised by Mr. NORMAN DODDS (Erith and Crayford, Lab.), who has been a leading critic of what he regarded as anomalous if not unjust decisions. The case he quoted on this occasion was an aircraftman who had been in the Service 11 months. In October, 1953, he fractured his right leg in two places. In June, 1954, after two previous deferments, he was passed A.1. Before being called up in July his foot was crushed in an accident and two toes were broken. In August he enlisted at Cardington. In April, 1955, he was sent to Iraq, in May reported sick seven times, on May 22 was seen by a specialist and admitted to hospital, and a month later was sent home in a hospital 'plane and admitted to hospital at Swindon. Mr. Dodds claimed that here was enough evidence to indicate that if some people could get out of service to carry on with sport this man should not be in the Services at all.

Mr. GEORGE WARD, Under Secretary of State for Air, gave the R.A.F. version of the story. The injuries previous to enlistment were not disputed. In the R.A.F. on recruit training he was excused physical training. In Iraq he was seen by the medical officer on May 9, 11, and 12 because of a colicky abdominal pain, but no abnormality was found. His early return to this country did not arise from any foot or leg trouble. The specialists in Iraq and England concluded independently that he was suffering from mild dyspepsia of nervous origin.

Mr. Ward ended by explaining the principles that guided R.A.F. doctors in deciding whether an airman who might be a borderline case was fit to complete his National Service. The first question was: Is the man's condition likely to be aggravated to a material degree by further service? In the case of Cowdrey that produced a categorical "Yes" from an eminent civilian orthopaedic surgeon, as well as from a Service man. That did not apply in the case detailed by Mr. Dodds. The second question was whether there was a chance that an airman would become physically unfit from any form of R.A.F. service. That again applied to Cowdrey. The third question was whether the man's condition was likely to need frequent treatment and to result in excessive loss of his usefulness to the R.A.F. All these questions were put by the doctors themselves, and they were put in the case of this airman. It might be that as a result of further care and treatment the third question was the only one that could possibly apply to him. Mr. Ward declared himself satisfied that there had been no lack of medical care, no injustice, and generally no foundation for anxiety about the care which National Service men received in the R.A.F.

Hydrogen Bomb Fall-out

Major G. LLOYD-GEORGE, the Home Secretary, corrected on July 28 misunderstandings that appeared to have arisen from abbreviated summaries of an account given by Dr. Willard Libby, of the U.S. Atomic Energy Commission, about the effects of fall-out from a hydrogen bomb over an area of 100,000 sq. miles.

The total fission products from bombs of the same type and power were always constant, the Home Secretary stated. Therefore the larger the area over which those fission products fell the lower would be the average intensity of radiation. The full text of Dr. Libby's statement showed that he quoted the area of 100,000 sq. miles as a simple illustration. His calculations assumed the total contamination to be spread uniformly, which in practice could not occur. The result of assuming a uniform spread over such an area was that the degree of contamination would be everywhere lower—and therefore much less dangerous—than if the bulk of the fall-out had been concentrated in a very much smaller area, as happened in the Bikini test, where the area of high concentration was of the order of 7,000 sq. miles.

Cardiff Teaching Hospital.—As soon as agreement has been reached on the accommodation to be provided in the new Welsh teaching hospital at Cardiff, which it is hoped will be before the end of the year, architects will be invited to submit plans for the hospital.

Mental Hospitals.—On present estimates, about 8% of the £17m. capital programme recently announced for hospital building is represented by mental hospital projects, and 14% by mental deficiency projects.

Nerve Gas Protection.—Army respirators, when properly put on, will give complete protection against nerve gas. Liquid nerve gas can penetrate the skin rapidly and cause casualties. Protective clothing would therefore be provided if necessary.

The Services

Major R. Montgomery and Captain G. C. Metcalfe, R.A.M.C., have been mentioned in dispatches in recognition of distinguished services in Kenya during the period October 21, 1954, to April 20, 1955.

Medico-Legal

POLICE EVIDENCE ON MENTAL ILLNESS

Below is given an abridged report of the written evidence presented by the Association of Chief Police Officers of England and Wales to the Royal Commission on the Law Relating to Mental Illness and Mental Deficiency.

The police are concerned with persons suffering from mental illness or defect mainly in two ways : first to assist the proper authorities in restraining or controlling those who are making a nuisance of themselves and inconveniencing the public, and secondly in detecting crimes which have been committed by such people. It is primarily the "persons of unsound mind" rather than the "mental defectives" who cause both sorts of trouble. The commission of thefts and similar offences by those who are mentally ill or deficient causes some but not an undue amount of trouble and concern: arson and other forms of malicious damage cause somewhat more trouble ; but it is the sexual and assault type of case which gives the police most cause for worry.

Mental Defectives

The mental defective, once so classified, is probably under close control and supervision for the rest of his life. His whereabouts or activities can generally be traced. The mental defective may resort to petty larceny or even housebreaking, arson and other forms of wilful damage, and carnal knowledge offences, mostly against co-defective victims. The more serious forms of assault are not normally attributed to him. The mental defective is a frequent culprit of indecent exposure ; this may appear at first sight to be relatively harmless, but it has two serious aspects. Indecent exposure may corrupt the young or do serious mental injury either to the young or to the oversensitive type of woman ; in addition it often leads to other forms of sexual exhibitionism or assault (generally of the milder type) against male or female, with even greater liability to corruption or to mental injury than in the case of indecent exposure.

Persons of Unsound Mind

This type of case, from a police point of view, presents a much more serious and difficult problem. Unlike the case of the mental defective, the hazard may present itself suddenly and without warning, and in its most dangerous form, on the first occurrence of illness. There can be no remedy or safeguard against that, nor can anything be done to assist the police in detecting such an offender if his identity is unknown. Unfortunately, too, it is in respect of these persons that the present system seems to lack something in subsequent control and safeguard: the interests of the public seem to be weighed too lightly against the chance of a return to normality in the patient.

It is said that on the first threat of trouble some offenders at once place themselves in an institution as voluntary patients with a view to avoiding court proceedings and in full knowledge of the fact that they may discharge themselves at will when they consider that the risk of proceedings has passed. The advice on this matter, given by the Director of Prosecutions, is that if the offence is a serious one—especially if against the person—the presence of the prisoner should be secured before the court. However, the initial action taken by the prisoner is in most cases bound to attract some sympathy from the court.

More Supervision

If there is to be a tendency towards the use of voluntary submission rather than certification, the chances of voluntary discharge must be increased and of effective extra-institutional control must be complicated. As a result of both tendencies the likelihood of such a person being present in a locality where his presence is unknown is greatly increased. Numbers of such persons who are believed to have been cured under the present system have subsequently repeated their offences and have been difficult to trace. The police fear that the numbers are bound to increase under the proposed more liberal procedure unless some effective countermeasures are instituted.

It seems that to improve the present position, and to offset the natural tendencies of any further reforms, responsible authorities must pick out the vicious type of patient and also the sexually inclined patient for prolonged and effectual extra-institutional control and/or supervision even if, in his interest, his period of residence in an institution tends to become shorter than was formerly the case. This would involve a new principle of supervision ; perhaps it could be added to the burden of the local authorities' authorized officers for mental deficiency, even if it means appointment of additional personnel.

The Chief Officers of Police have reason to be concerned about the apparent ease with which persons certified to be of unsound mind, and who have displayed sexual and other vicious tendencies, obtain freedom to move as they will on parole, on trial, or by securing their complete discharge. The police experience great difficulty when investigating serious crime apparently committed by persons with such tendencies, owing to their inability to make sure that the presence in the locality of former patients with such tendencies is revealed. In the absence of very special new measures to compensate the natural consequence of any relaxation of the present system of certification and supervision, such relaxation may have serious effects upon the actual safety of the ordinary citizen, and upon his sense of safety, and perhaps this aspect is being subordinated to the understandable ideal of affording the patient the maximum possible sense of freedom and self-reliance to assist him in his recovery.

MIDWIVES ACT PROSECUTION

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

Section 9 of the Midwives Act, 1951, which repeats and amplifies s. 1 (3) of the Midwives Act, 1902, and s. 1 of the Act of 1926, makes it an offence punishable by a fine of up to £10 for any woman not certified under the Midwives Acts, or any male person, to attend a woman in childbirth, other than under the direction and personal supervision of a qualified medical practitioner.

The section does not apply to student doctors or midwives, nor where the person accused proves that the attention was given in a case of sudden or urgent necessity.

William Bingham, a diet reformer and student of "natural healing," of Sandhurst, Gloucestershire, was prosecuted under the section before the Gloucester justices[1] on July 28 for attending his wife when she was having a baby and delivering the child himself. Bingham said in evidence that it was the second child he had delivered. He was fined £3.

DAMAGES FOR LOST ARM

Damages of £2,000 were awarded by Mr. Justice Pilcher at Hampshire Assizes on July 29 to Mrs. Irene Fowler, aged 39, of Yeovil, whose right arm had to be amputated after it had been broken in a fall in her garden in February, 1952, and gas gangrene had developed. Her husband, Mr. Walter Herbert Fowler, was also awarded £2,000 for expenses he had incurred and would have to meet because of his wife's disability. Husband and wife had sued the South-west Metropolitan Regional Hospital Board, the West Dorset Group Hospital Management Committee, and Dr. Richmond McIntosh, of Sherborne, alleging negligence in the treatment of Mrs. Fowler. Negligence was denied.

In giving his judgment the judge said that Mrs. Fowler broke both bones in the right forearm and there was a small punctured wound caused by the bones. At the Yeatman Hospital, Sherborne, an unpadded plaster was applied to the arm.

[1] *The Times*, July 29, 1955.

He found it impossible to absolve Dr. McIntosh from some responsibility for his failure to treat Mrs. Fowler with a course of penicillin injections. Good practice demanded that a fracture of that kind should not be enclosed at once in an unpadded cast. The judge said he accepted that Dr. McIntosh had been puzzled and very worried over the case. Neither side had been prepared to defend the failure on the part of the doctor completely to split the plaster in view of the symptoms observed of severe interference with the blood circulation. The defendants had submitted that it was the unsuspected presence of gas gangrene which caused the arm to swell immoderately. He did not blame Dr. McIntosh for failing to suspect in the first place that the arm might have become infected with gas gangrene, nor did he blame him for failing to diagnose it when he cut the plaster completely. The judge said he found that the fitting of a close and unpadded plaster immediately after the reduction of the fracture interfered with the circulation, creating a condition in which the preventive and curative effects of free circulation provided by nature were removed.

The Medical Protection Society instructed Messrs. Le Brasseur and Oakley to act for Dr. McIntosh.

Universities and Colleges

UNIVERSITY OF ST. ANDREWS

The following candidates have been approved at the examinations indicated:

M.D.—J. R. Anderson (with highest honours and a University gold medal), Mrs. Katerina Rhodes (with commendation and a Rutherford silver medal), E. S. Meek, A. Inglis.

M.B., CH.B.—*P. J. Dennis, *N. B. Scrimgeour, *T. Duncan, *D. W. Eason, *N. B. Rewcastle, K. M. Armit, F. C. Armstrong, P. R. Baker, G. G. W. Bennett, Joy D. Bowman, H. M. Brodie, J. A. Carne, G. D. Chisholm, K. G. Cook, J. A. Cooper, Margaret M. R. Daly, G. C. A. Denholm, A. R. R. Eason, T. A. English, W. G. Fairchild, R. A. Forrester, H. C. Fowlie, A. W. Gillon, J. C. Griffiths, Elizabeth Heathcote, W. P. Hendry, K. I. M. Hogg, W. Kerr, J. A. Kirkland, A. Leeming, I. J. MacBean, D. Macintyre, R. McLaren, R. B. Malcolm, W. G. Mathews, F. Mills, J. D. Muir, Muriel K. Nicoll, D. M. Norrie, Millicent B. O'Meara, Elma E. Rankine, D. Redstone, C. R. Rizza, H. R. Seddall, June M. B. Spain, A. F. Taylor, Ann J. Temple-Raston, Joyce E. Thicknesse, W. J. Thomson, J. S. Wallace, D. J. Ward, Margaret H. Watson, J. P. L. Welch, Edith J. Wilson, I. D. Wilson, K. W. Wilson, W. M. Yeaman, Mrs. Joyce A. Yerex.

*With commendation.

UNIVERSITY OF GLASGOW

The following degrees were conferred on July 9:

M.D.—J. B. Clark, G. H. Collins, R. I. S. Dunn (with honours), W. McL. Gregor, J. S. McMillan (with commendation).

CH.M.—K. C. Wybar (with high commendation).

M.B., CH.B.—J. Bain, W. W. Baird, W. Bargh, A. S. Barr, J. D. Barrie, Jean A. S. Blair, D. W. Blake, Isabel F. Bowyer, S. E. Brill, D. W. A. Brown, Sheila M. McN. Brownlie, I. J. Burns, D. J. C. Cameron, A. G. M. Campbell, H. P. Camrass, [1]L. C. Capaldi, I. A. Carr, A. C. Chalmers, B. I. Chazan, C. E. Coley, F. E. Colen-Ramos, R. H. Cox, J. W. Crawford, W. A. Crosbie, Anne F. Cullen, Isobel Cunningham, E. T. Cusick, Fiona M. Davidson, S. I. Davidson, J. P. Deans, W. H. Dickson, Elizabeth L. R. Douglas, Sheila M. Driver, [1]G. Duncan, [1]Sheila L. B. Duncan, M. G. Dunnigan, J. A. Evitt, D. J. M. Ferguson, J. G. M. Ferguson, H. Forrest, H. J. Freedman, [1]Sheila C. Gardiner, D. A. M. Gebbie, Iris I. J. M. Gibson, Margaret G. Gillan, J. S. Graham, P. B. McN. Gray, J. A. Hamilton, Elizabeth A. Hardie, J. C. Hay, A. Henderson, Catherine C. Henderson, J. G. Hill, J. A. Hynes, I. W. Jamieson, Flora M. Judd, D. Kennedy, G. B. Kennedy, W. W. Kennedy, A. H. Laing, Patricia Laird, W. Lang, S. Levenson, S. Levine, Jane B. Lindsay, J. L. Lindsay, V. S. Livingston, I. G. Livingstone, W. Logan, W. C. Love, H. MacAnespie, J. V. McBride, L. J. McCarroll, W. M. McCrae, C. J. McCrone, J. McD. McCulloch, A. P. Macdonald, H. D. MacEwan, I. R. McFadyen, J. McGeachie, K. L. McGeoch, Janie M. McIntyre, N. F. McLellan, W. McL. McLenachan, A. McQuaid, W. M. McQuillan, A. M. Matthews, J. S. Millar, R. G. Milne, [1]Shams-ud-Deen Bhanji Mohamed, J. G. McL. Mortimer, Margaret H. Murray, A. J. B. Neil, W. Neilson, Sheila C. C. Nisbet, G. Noble, P. B. O'Halloran, Anne O'Neill, R. C. Paterson, A. Patrick, [1]A. Pringle, Gwyneth J. Reid, H. C. Reid, J. M. Reid, W. H. Reid, A. D. Revels, N. S. Rihal, Elizabeth R. J. Ritchie, Margaret E. G. Ritchie, F. E. Russell, A. McA. Scott, [1]A. C. Scott, jun., D. J. S. Shaw, R. W. G. Smart, A. J. Smellie, Anne M. S. Smith, M. A. F. Smith, J. S. K. Stevenson, [1]R. S. Stevenson, A. T. Stewart, J. T. Stewart, J. F. W. Sutherland, Edna Thomson, J. N. S. Thomson, A. K. Walker, C. J. White.

[1]With commendation.

UNIVERSITY OF DURHAM

In Congregations on July 1 and 2 the following medical degrees and diploma were conferred:

M.D.—S. Bell, A. R. Horler, E. G. Knox, J. P. Birkett, B. M. Herbertson, G. E. Paget, and, *in absentia*, S. G. Owen, K. V. Robinson.

M.B., B.S.—D. O. Asekun, Audrey M. Ashworth, Patricia Atkinson, Vivienne Bartram, J. R. Bell, D. A. Black, W. Bowman, F. Clark, D. M. Conning, Sheila M. Duffie, Joan Errington, K. B. Forster, J. S. Garwood, Patricia M. Hickey, J. D. S. Hodgson, J. E. Hume, J. M. Hunter, G. D. Hurrell, Mary A. M. Irwin, Barbara J. Larard, N. H. Lawrence, R. Layton, G. F. Lewis, C. C. McGregor, I. MacLeod, P. Morgan, P. C. Murray, N. N. Nelson, H. Neubauer, G. O. Ogunmekan, G. T. Perks, N. Potter, R. C. Richards, Vivien A. Ropner, Margaret Saint, G. S. Semb, J. H. T. Shaw, A. R. Smith, A. H. Smith, D. R. Smith, R. N. Spencer-Gregson, T. I. Stewart, Brenda J. Stockman, J. L. Thomas, R. S. Thomson, Wanda Trowsdale, J. C. Wallace, M. Y. Walls, J. Westwood, J. Williams, Maidie E. Wilson, Sheila L. Wilson, A. Worlock, J. Wright, R. Zissler, and, *in absentia*, Anne Allison, H. P. Engel, M. J. Fry, O. B. Gibson, E. T. F. Kent.

DIPLOMA IN PSYCHOLOGICAL MEDICINE.—Gertrude Latner.

UNIVERSITY OF EDINBURGH

At a Graduation Ceremonial on July 20 the following degrees and diplomas were awarded:

M.D.—D. I. McCallum, A. F. Phillips (awarded gold medal for thesis), T. G. Wilson (commended for thesis).

PH.D.—*In the Faculty of Medicine*: *Z. I. El-Darawy, Jean D. Garven, B. M. Hobson, *W.-N. S. Law, M.B., B.S., A. K. Lough, *L. W. Macpherson, D. Raymahasaya, M.B., B.S., Lilly C. G. Thomson.

M.B., CH.B.—P. J. Adams, A. O. Aderemi, F. Albert-Recht, D. P. Anderson, Elizabeth H. Angus, J. B. Arnot, D. M. Bachop, T. J. Bailey, Elsie T. Ballingall, C. A. Biagi, G. J. Biggam, J. W. Black, Diana R. E. Bridgford, C. J. Brigimen, J. D. Brown, T. R. Brown, Lorna M. Browne, T. A. S. Buist, Marjorie, A. Cale, Aileen, A. Calder (formerly Morrison), D. F. Cameron, Joan M. Cameron, Anne L. Campbell, Sheena W. Campbell, J. R. G. Carrie, L. E. S. Carrie, Bessie J. Catton, K. Chapman, E. D. Colterjohn, †Elizabeth M. Connell, W. C. Constable, Margaret H. Cooper, A. W. Craig, D. McI. Craigie, H. A. Crispin, I. H. Currie, G. M. Daniels, R. E. Dixon, Isabel E. Dobie, J. F. Donald, R. W. Douglas, D. Dow, D. Doyle, Christina F. J. Ducksbury, G. H. Ewing, J. S. Fleming, W. D. McE. Forbes, R. L. Frew, June Garden, P. J. Gillies, R. B. J. Goldie, A. M. Grier, T. O. Grundy, J. C. Guignard, Elizabeth L. Handasyde, R. A. Harkness, †W. C. Hartley, E. W. Horton, E. C. A. Huckett, G. F. Hunter, N. W. Imlah, A. Jamieson, M. G. Kerr, J. F. Lamb, W. I. Lamont, J. A. Laurenson, J. R. Ledsome, D. I. MacG. Linklater, A. L. Linton, J. McK. Lonie, Elizabeth M. McM. Love, I. A. McClure, Rosemary McCredy, M. E. McCullough, D. W. Macdonald, A. W. McKenzie, H. M. Mackenzie, L. B. McKenzie, F. I. Macnaughton, J. T. A. Manley, Valerie J. Marrian, L. V. H. Martin, Beatrice Marwick, J. M. Melville, Mary S. Merrie, I. Michie, J. A. Milligan, Eiona I. Moir, S. T. Morton, J. S. Munro, C. D. Musk, D. O. Oliver, D. Ll. Owen, W. G. Paterson, P. N. Paterson-Brown, Margaret E. Paul, G. E. Paveley, G. Philp, D. D. Pottinger, R. N. Reeve, Margaret A. Robb, Sheila J. B. Robertson, P. F. Roe, C. M. D. Ross, Audrey H. Rundle, S. R. Scott, Margaret H. Seath, O. Seriki, J. C. M. Sharp, G. J. M. Slawikowski, I. McD. Smith, T. H. M. Stewart, G. B. Sturrock, Ann M. H. Sutherland, †G. R. Sutherland, I. A. G. Sutherland, Elizabeth A. Taylor, J. R. Taylor, H. S. Tinniswood, J. Upton, Audrey P. Ward, D. M. Weir, R. F. Williams, J. McI. A. Willox, S. W. Willox, Elizabeth H. Wilson, Marjorie A. Wright, J. H. Yeoman.

DIPLOMA IN PUBLIC HEALTH.—J. W. Bringan, Joan Campsie, L. J. Charles, A. S. Sethi, W. A. Simpson, J. D. Stewart, J. G. Thomson.

DIPLOMA IN TROPICAL MEDICINE AND HYGIENE.—Maung Galay, H. A. S. Joseph, J. D. Macgregor, A. C. N. Millar, D. Penman, U. S. P. Singh, S. Zacharias, C. Prasad.

The following scholarships, etc., were awarded in the Faculty of Medicine: *Ettles Scholarship and Leslie Gold Medal in Medicine*, Elizabeth M. Connell and G. R. Sutherland (equal). *Scottish Association for Medical Education of Women Prize*, Elizabeth M. Connell. *Buchanan Scholarship in Obstetrics and Gynaecology*, W. C. Hartley. *James Scott Scholarship in Obstetrics and Gynaecology*, Anne L. Campbell. *Mouat Scholarship in the Practice of Physic*, Joan M. Cameron. *Murchison Memorial Scholarship in Clinical Medicine*, A. W. McKenzie. *Beaney Prize in Anatomy and Surgery*, G. R. Sutherland. *Dorothy Gilfillan Memorial Prize*, Valerie J. Marrian. *Lawson Gifford Prize in Obstetrics and Gynaecology*, Margaret E. Paul. *Murdoch Brown Medal in Clinical Medicine*, D. M. Bachop. *National Association for the Prevention of Tuberculosis Prize* and *Wightman Prize in Clinical Medicine*, E. W. Horton. *Royal Victoria Hospital Tuberculosis Trust Gold Medal*, A. W. McKenzie; *proxime accessit*, J. S. Fleming. *Sir Robert Jones Prize for Orthopaedic Surgery*, H. A. Crispin. *Graduate Research Fellowships*, Elizabeth M. Humphreys and J. R. Laidlaw. *Sir David Wilkie Research Fellowships in Surgery*, G. W. Milton. *William Goodall Gibson Fellowship*, L. J. P. Duncan. *Graduate Research Scholarships*, Margaret F. Jamieson, F. Muldowney, and R. H. P. Reid. *Paterson Travelling Scholarship in Surgery*, Sir James David Fraser. *Whaitt Research Scholarship*, J. C. H. Dunlop. *Greig Medal for Tropical Medicine*, D. Penman.

**In absentia.* †With honours.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

At a meeting of the Council of the College held on July 23, with the President, Sir Arthur Gemmell in the chair, the following were elected to the Membership:

H. McK. G. Agnew, M. M. Baskin, L. Bhose, M. L. Bloom, A. G. Bond, E. P. Campbell, Tuck Kwong Chong, Mary G. Coyle, J. W. G. Evans, R. W. Forman, M. Ghosh, J. A. Holmes, L. M. Jacks, J. D. C. Lyons, J. MacVicar, N. P. Nayak, Mary Phillips, I. Rocker, J. P. Roux, A. H. Rowson, S. Sacks, J. R. Saunders, Muriel J. Scudamore, H. G. I. Shanks, C. D. Smith, R. McN. Thomson, R. F. Zacharin.

Vital Statistics

Industrial Accidents and Diseases

The number of workpeople (other than seamen) in the United Kingdom whose deaths from accidents in the course of their employment were reported in June was 105, compared with 103 (revised figure) in the previous month and 119 (revised figure) in June, 1954.

The numbers of cases of industrial diseases in the United Kingdom reported during June, 1955, were as follows: lead-poisoning 7, anthrax 1, epitheliomatous ulceration 20, chrome ulceration 46; total 74. There were no deaths.—*Ministry of Labour Gazette*, July, 1955.

Glandular Fever at the Royal Free

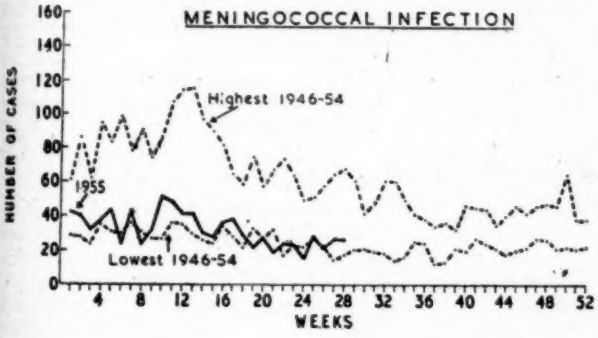
The outbreak of glandular fever at the Royal Free Hospital was showing signs of declining by August 2. There were 82 cases, comprising 58 nurses, 3 patients, and 21 others (including 2 doctors).

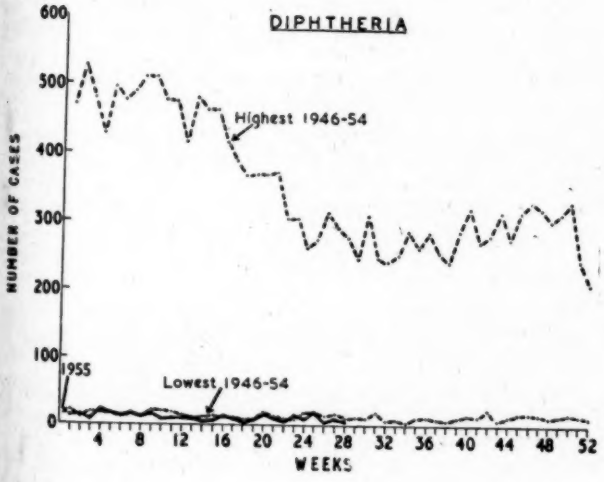
Week Ending July 23

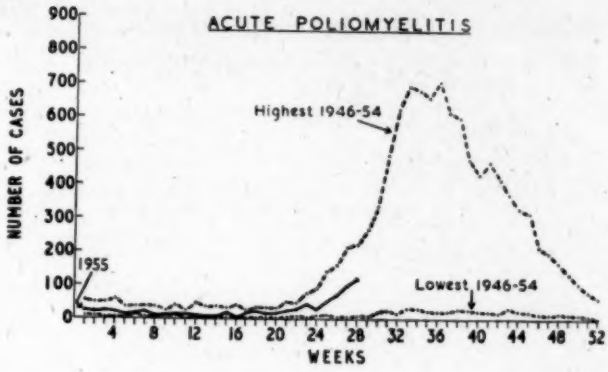
The notifications of infectious diseases in England and Wales during the week included: scarlet fever 352, whooping-cough 1,788, diphtheria 8, measles 14,536, acute pneumonia 248, acute poliomyelitis 177, dysentery 548, paratyphoid fever 20, and typhoid fever 9.

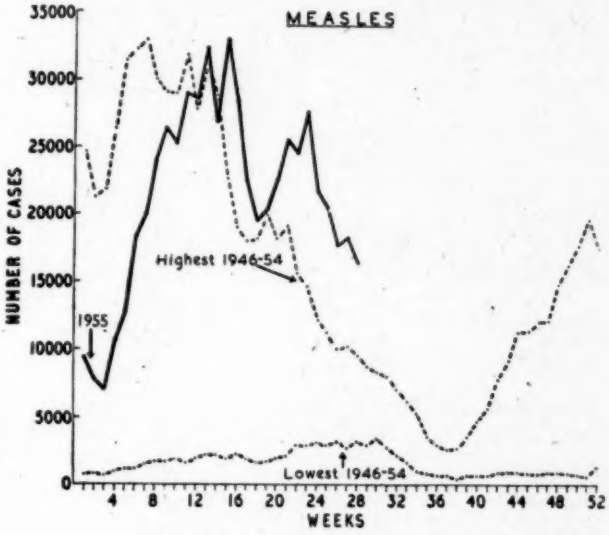
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported in each week during the nine years 1946–54 are shown thus ------, the figures for 1955 thus ———. Except for the curves showing notifications in 1955, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









Infectious Diseases

A decrease in incidence was recorded for most notifiable diseases in England and Wales during the week ending July 16. The falls in the number of notifications included 1,950 for measles, from 18,375 to 16,425, 105 for whooping-cough, from 1,865 to 1,760, and 96 for scarlet fever, from 556 to 460.

The largest declines in the incidence of measles were 231 in Yorkshire West Riding, from 932 to 701, 223 in Essex, from 660 to 437, 191 in Lancashire, from 846 to 655, 171 in Southampton county, from 1,040 to 869, 161 in Devonshire, from 865 to 704, and 148 in Kent, from 1,249 to 1,101. The largest fluctuations in the trends of whooping-cough were a decrease of 38 in Kent, from 99 to 61, and a rise of 31 in Surrey, from 48 to 79. The largest fall in scarlet fever was 19 in London, from 41 to 22. 7 cases of diphtheria were notified, being 3 fewer than in the preceding week. The only area with a multiple case was Birmingham C.B. with 2 notifications.

120 cases of acute poliomyelitis were notified, and these were 16 more for paralytic and 5 more for non-paralytic cases than in the preceding week. The disease is still mainly concentrated in four areas, Yorkshire West Riding 24 (Barnsley C.B. 6, Leeds C.B. 3, Hoyland Nether U.D. 3, Darton U.D. 2, Rotherham R.D. 2), London 22 (Poplar 4, Bethnal Green 2, Islington 2, Paddington 2, Stepney 2), Lancashire 15 (Liverpool C.B. 4, Manchester C.B. 4), and Warwickshire 10 (Birmingham C.B. 9).

596 cases of dysentery were notified, being 6 more than in the preceding week. The largest returns were Lancashire 175 (Liverpool C.B. 40, Crosby M.B. 37, Manchester C.B. 19, Ashton-under-Lyne M.B. 14, Blackpool C.B. 12, Bolton C.B. 12), London 64 (Southwark 12), Yorkshire West Riding 59 (Leeds C.B. 32), Durham 43 (South Shields C.B. 11), Staffordshire 23 (Newcastle-under-Lyme M.B. 13), and Middlesex 21.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **July 16** (No. 28) and corresponding week 1954.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 160 great towns in England and Wales (London included), London administrative county, the 17 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 14 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1955					1954				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	7	0	2	0	1	11	2	4	0	1
Dysentery	596	64	168	7		608	76	142	6	0
Encephalitis, acute	5	0	0	0		7	0	1	0	
Enteric fever:										
Typhoid	7	1	0	0	1	11	2	0	0	1
Paratyphoid	16	1	3	0		13	1	1	0	0
Food-poisoning	382	52		0		383	20		3	
Infective enteritis or diarrhoea under 2 years				9	19				14	15
Measles*	16,425	272	93	228	207	3,073	191	52	162	220
Meningococcal infection	27	2	4	0		37	1	9	2	0
Ophthalmia neonatorum	45	1	5	0		37	1	5	0	
Pneumonia†	232	12	86	3	1	312	24	69	0	2
Poliomyelitis, acute:										
Paralytic	78	11	9	1	1	42	4	9	2	2
Non-paralytic	42	11				21	2			
Puerperal fever§	229	44	3	0	2	242	53	9	0	0
Scarlet fever	460	22	40	10	12	802	57	89	19	26
Tuberculosis:										
Respiratory	695	58	110	24		737	86	151	34	
Non-respiratory	134	7	18	5		124	8	19	5	
Whooping-cough	1,760	50	90	74	63	2,235	109	186	24	30

DEATHS in Great Towns	1955					1954				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	1	0	0	0	0	0	0	0	0	0
Dysentery	0	0		0		0	0		0	
Encephalitis, acute		0			0		0			0
Enteric fever	0	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years	6	0	1	0	0	6	6	0	0	1
Influenza	2	0	0	0	0	6	1	0	0	0
Measles		0	1	0	1		0	0	0	
Meningococcal infection		0	0				0	0		
Pneumonia	167	23	21	5	4	152	17	13	5	9
Poliomyelitis, acute	3	0			0	3	1			0
Scarlet fever		0	0	0	0		0	0	0	0
Tuberculosis:-										
Respiratory	55	8	5	1	2	77	8	8	2	2
Non-respiratory		0	0	2	1		1	10	0	1
Whooping-cough	1	0	0	0	0	3	1	1	0	0
Deaths 0–1 year	169	28	29	5	13	166	14	28	2	17
Deaths (excluding stillbirths)	4,651	663	533	92	169	4,446	626	480	90	150
LIVE BIRTHS	7,511	1116	850	231	347	7,615	1163	905	186	391
STILLBIRTHS	205	29	35			203	31	23		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Medical News

The U.S. Secretary of Health.—Mr. MARION FOLSOM was sworn as Secretary of Health, Education, and Welfare in Washington on August 1. He succeeds Mrs. Oveta Culp Hobby, who resigned recently. Mr. Folsom, who is 61, was previously Under-Secretary of the Treasury.

University of Dublin.—The Board of Trinity College has decided to appoint full-time professors of medicine and surgery in the School of Physic. The object is to bring about more direct and formal co-ordination of the various aspects of clinical teaching, and to further clinical research. It is hoped that appointments to these chairs will be made before the end of this year.

Cancer as a World Problem.—Sir HAROLD HIMSWORTH, F.R.S., secretary of the Medical Research Council, was one of five authorities on cancer and medical research asked by Dr. M. G. CANDAU, director-general of the World Health Organization, to advise on W.H.O.'s proper place in the cancer field. The others were Professor J. H. MAISIN (Belgium), chairman, Dr. I. BERENBLUM (Israel), Dr. J. CLEMMESEN (Denmark), and Professor V. R. KHANOLKAR (India). They defined W.H.O.'s most fruitful spheres of effort as: (1) The collection and publication of statistics on the prevalence of different kinds of cancer, particularly from countries with poorly developed cancer services. An indication of the degree of reliability of the statistics would be desirable. (2) The establishment of international standards and definitions of the various types of cancer. A further service would be to provide laboratories with cancer specimens corresponding to the definitions. (3) The encouragement of research, by identifying and defining suspected cancer problems throughout the world, and perhaps on occasion by co-ordinating international studies. W.H.O. should continue its established policy of stimulating research rather than actually engaging in research. (4) The provision of fellowships to assist cancer workers to train and gain experience abroad, and the dispatch of consultants to countries needing assistance in developing their cancer services. (5) Co-ordination and liaison with other interested international organizations, and the expansion of W.H.O. library and reference services on cancer, particularly in regions other than Europe and America. So far W.H.O. has given 25 fellowships for studies in cancer; in addition a cancer consultant has been sent to Teheran to assist the Iran Government in establishing a cancer centre there.

Blair Bell Medal.—At the 14th British Congress of Obstetrics and Gynaecology in Oxford last week Sir WILLIAM GILLIATT, president of the Royal Society of Medicine, presented the Blair Bell Medal to Dr. LEONARD COLEBROOK, F.R.S., for his work on puerperal sepsis. It was in 1936, while director of the laboratory at Queen Charlotte's Hospital, that Dr. Colebrook conclusively demonstrated the value of "prontosil," the first of the sulphonamides, in the treatment of this condition. The medal is awarded quinquenially by the Royal Society of Medicine for the advancement of science in gynaecology or obstetrics.

Crash Helmets Compulsory in New Zealand.—From March 1 next year it will be compulsory for motor-cyclists and pillion-riders in New Zealand to wear an approved type of crash helmet, if they travel at more than 30 miles an hour (48 km. per hour). Out of 41 motor-cyclists killed so far this year in New Zealand, 37 were not wearing crash helmets.

Dr. Loyal Davis, of Chicago, was admitted to the honorary fellowship of the Royal College of Surgeons of England at the Council meeting on July 28.

Dr. D'A. Kok, who graduated B.Sc. Witwatersrand in 1938 and M.D. London in 1950, has been appointed a lecturer in medicine at Cambridge. He is at present a chief assistant at St. Bartholomew's Hospital, London.

Dr. Geoffrey Dudley, who is in general practice at Stourbridge, Worcestershire, has received the Queen's Commendation for Brave Conduct "for services when tackling a mentally deranged person armed with a knife."

COMING EVENTS

World Congress of Anaesthetists.—The 1955 congress of the World Federation of Societies of Anesthesiologists will be held at Scheveningen, The Hague, from September 5 to 10. The Netherlands Society of Anaesthetists is organizing the conference, which is open to all physicians interested in the subject. Inquiries to executive manager, World Congress of Anesthesiologists, Bilthoven, Holland.

International Congress on Allergology.—The second congress will be held in Rio de Janeiro, Brazil, from November 6 to 13. On the three days preceding the congress there will be an intensive course on allergy. Details from the secretary general, Avenida Rio Branco 277, 7° andar, grupo 705, Rio de Janeiro.

Harben Lectures.—Sir ERNEST ROCK CARLING will deliver the 1955 Harben Lectures of the Royal Institute of Public Health and Hygiene on December 5, 6, and 7 at 5 p.m. His subject will be "Radiological Protection."

8th International Congress of Paediatrics will be held in Copenhagen, July 22–27, 1956. Further information from the Congress office at Domus Medica, 12A Kristianiagade, Copenhagen Ø.

NEW ISSUES

British Journal of Industrial Medicine.—The new issue (Vol. 12, No. 3) is now available. The contents include:

EMPHYSEMA AND PROTEINURIA IN MEN CASTING COPPER-CADMIUM ALLOYS. J. A. Bonnell.
APPENDIX: PHYSICO-CHEMICAL EXAMINATION OF THE SERUM AND URINE PROTEINS IN SOME CASES OF CADMIUM POISONING. R. A. Kekwick.
AN ENVIRONMENTAL STUDY OF CASTING COPPER-CADMIUM ALLOYS. E. King.
DISABLING PNEUMOCONIOSIS FROM LIMESTONE DUST. A. T. Doig.
AN EPIDEMIOLOGICAL STUDY OF BYSSINOSIS AMONG LANCASHIRE COTTON WORKERS. R. S. F. Schilling, J. P. W. Hughes, I. Dingwall-Fordyce, and J. C. Gilson.
THE EFFECT OF CORTISONE ON ESTABLISHED SILICOTIC FIBROSIS IN THE LUNGS OF RATS. E. J. King, C. V. Harrison, and Daphne Attygalle.
LEPTOSPIROSIS IN SOUTH-EAST SCOTLAND. P. N. Edmunds.
ENERGY COST OF SOME INDUSTRIAL OPERATIONS. D. Turner.
CUTTING OILS AND SQUAMOUS-CELL CARCINOMA. PART I: INCIDENCE IN A PLANT, WITH A REPORT OF SIX CASES. Ernest Mastromatteo.
CUTTING OILS AND SQUAMOUS-CELL CARCINOMA. PART II: AN EXPERIMENTAL STUDY OF THE CARCINOGENICITY OF TWO TYPES OF CUTTING OILS. I. F. W. Gilman and S. D. Vesselinovitch.
RHEUMATISM IN COAL-MINERS. PART III: OCCUPATIONAL FACTORS. J. S. Lawrence.

Issued quarterly; annual subscription £2 2s.; single copy 12s. 6d.; obtainable from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

APPOINTMENTS

BAIRD, IAN MCLEAN, M.B., M.R.C.P., Leverhulme Research Scholar of the Royal College of Physicians of London, at Department of Therapeutics, Royal Infirmary, Sheffield.

BARKER, ROSETTA CATHERINE, M.B., B.Ch., D.P.H., Medical Officer of Health for East Retford Borough and Rural District and Assistant County Medical Officer, Nottinghamshire.

BODKIN, KATHLEEN M., M.R.C.S., L.R.C.P., D.P.H., Deputy Medical Officer of Health, Hendon, has been appointed Area Medical Officer (Area No. 4), Middlesex County Council, in succession to Dr. A. A. Turner (retired).

BOWEN, PHYLLIS E. M., M.R.C.S., L.R.C.P., D.P.H., D.C.H., Medical Officer of Health for Eastern Combined District of Pembrokeshire and Assistant County Medical Officer of Health.

CAMERON, A. D. C. S., M.B., Ch.B., D.P.H., Medical Officer of Health and Principal School Medical Officer, County Borough of West Hartlepool.

DAVIES, DEWI, M.D., M.R.C.P., Physician Superintendent, Ransom Sanatorium, and Consultant Physician, Mansfield Chest Clinic.

EVANS, D. M., M.B., B.Chir., Deputy Principal Medical Officer, United Kingdom Atomic Energy Authority.

HOPKINS, GEORGE BERNARD, M.B., Ch.B., B.Pharm., D.P.H., Assistant County Medical Officer of Health, Norfolk, and Medical Officer of Health for Downham Rural District, Marshland Rural District, and Downham Urban District.

HOSPITAL FOR SICK CHILDREN, Great Ormond Street, London, W.C.—C. H. M. Walker, M.D., M.R.C.P., D.C.H., Medical Registrar and Pathologist; K. Dalliwall, F.R.C.S., Part-time Senior Surgical Registrar; Deidre M. Airey, M.B., Ch.B., D.C.H., Assistant Resident Medical Officer, Tadworth Court; Ann E. Morgan, M.R.C.S., L.R.C.P., and S. Mason, M.D., D.C.H., House-physicians; D. J. O'Shaughnessy, M.B., B.S., House-surgeon; P. Hall, M.B., Ch.B., F.F.A. R.C.S., Junior Resident Anaesthetist; June Barclay, M.B., Ch.B., D.C.H., House-physician to Neurological and Neurosurgical Department.

KING GEORGE VI HOSPITAL, Nairobi, Kenya.—The following physicians and surgeons have been reappointed to the honorary staff of the hospital for 1955-6: A. D. Charters, M.D., M.R.C.P., R. R. Henderson, M.D., M.R.C.P., J. C. Winteler, M.D., M.R.C.P., honorary physicians; Patience E. Davies, M.R.C.P., D.C.H., honorary paediatrician; F. Piers, M.D., honorary dermatologist; G. V. W. Anderson, M.S., F.R.C.S., J. O. Corbin, F.R.C.S. (Uro-genital), R. T. S. Goodchild, F.R.C.S.Ed., D.L.O. (Ear, Nose, Throat), J. A. S. Green, F.R.C.S., G. E. Nevill, M.Ch., F.R.C.S., E. Ronald Ormerod, F.R.C.S.Ed., M.R.C.O.G. (Gynaecology), P. G. Preston, F.R.C.O.G. (Gynaecology), G. Williams, F.R.C.S. (Orthopaedic), A. M. Wood, F.R.C.S. (Plastic); J. A. Carman, M.D., F.F.A. R.C.S., honorary anaesthetist.

LONDON TRANSPORT.—G. C. Acres, M.R.C.S., L.R.C.P., Medical Officer in charge of North-east Division Medical Centre at Manor House; J. L. Weeks, M.B., B.S., Medical Officer at South-west Division Medical Centre.

MANCHESTER REGIONAL HOSPITAL BOARD.—P. H. Jones, F.R.C.S., Consultant Thoracic Surgeon, with main duties at Baguley Hospital, Manchester, and Park Hospital, Davyhulme; Olga Bauerova, Med.Dipl., D.M.R., Whole-time Consultant Radiologist to Bury and Rossendale and Rochdale and District Hospitals; R. C. S. Pointon, M.B., B.Chir., F.F.R., D.M.R.T., Whole-time Assistant Radiotherapist (S.H.M.O.), Christie Hospital and Holt Radium Institute, Manchester; J. M. Cuthill, M.B., Ch.B., D.P.M., Whole-time Assistant Psychiatrist (S.H.M.O.), Whittingham Hospital, near Preston; R. G. Williams, M.B., B.S., Whole-time Medical Director of two Mass Miniature Radiography units based on Salford and Rochdale.

SHARP, C. L. E. H., M.R.C.S., L.R.C.P., D.P.H., Senior Assistant County Medical Officer of Health, Gloucestershire County Council.

SHORT, RICHARD, L.R.C.P.&S.Ed., D.P.H., Area Executive Medical Officer, North 1 and 2 Areas, Northumberland; Medical Officer of Health to Alnwick Urban District Council and Rural District Council, Amble Urban District Council, Rothbury Rural District Council, Glendale Rural District Council, and Norham and Islandshires Rural District Council.

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THOMPSON, R. C. W., M.B., B.S., F.F.A. R.C.S., D.A., Part-time Consultant Anaesthetist, Charing Cross Hospital.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Smith.—On July 23, 1955, at the Leeds Maternity Hospital, to Dr. Kathleen (formerly Turner) and Irvine Smith, F.R.C.S., a son—Geoffrey.

MARRIAGES

Blackadder—Gordon.—On July 28, 1955, at St. Columba's, Pont Street, London, S.W., Eric Sutton Blackadder, M.B., Ch.B., R.N.V.R., to Jean Gordon.

DEATHS

Bethune.—On July 2, 1955, William Bethune, M.B., C.M., D.P.H., of 17, Walton Road, Thorpe Bay, Essex, formerly of Rickmansworth, Herts.

Carlin.—On July 11, 1955, at Atherstone, Warwicks, the result of an accident, Andrew James Martin Carlin, M.B., Ch.B.

Clow.—On July 16, 1955, at his home, Lilleybrook Rise, Charlton Kings, Cheltenham, Glos, David Clow, M.B., Ch.B., aged 84.

Essery.—On July 13, 1955, at Goose Green Cottage, Yateley, Camberley, Surrey, William Joseph Essery, C.V.O., M.B., aged 94.

Fell.—On July 12, 1955, at Archery Cottage, Malvern Wells, Worcs, Robert Fell, M.R.C.S., L.R.C.P.

Finlay.—On July 14, 1955, at Farnborough Hospital, Kent, James Jackson Finlay, M.B., Ch.B., of The Little House, Ninhams Wood, Farnborough, Kent, late of Blackheath and Charlton, London, S.E.

Gamble.—On June 23, 1955, at the North Staffordshire Royal Infirmary, Richard Raphael Gamble, M.B., B.Ch., of Elm Tree House, Penkhull, Stoke-on-Trent, Staffs.

Gillett.—On June 26, 1955, at 14, Upland Park Road, Oxford, Henry Tregelles Gillett, M.D., aged 84.

Green.—On July 4, 1955, at 61, Mountview Road, London, N., Edith Jennie Macgowan Green, L.R.C.P., L.R.C.S.Ed., aged 84.

Learmont.—On July 6, 1955, in hospital, Alan Ambrose Learmont, M.B., Ch.B., of Hovingham, York.

Luxmoore.—On June 28, 1955, in a nursing-home, Evelyn John Hansler Luxmoore, *M.C.*, M.R.C.S., L.R.C.P., Surgeon Lieutenant-Colonel, late The Life Guards, of Northcote Hill, Shamley Green, Surrey.

McDonald.—On July 5, 1955, at 4, Clark Place, Belford, Northumberland, William Miller Porteous McDonald, M.B., Ch.B., aged 48.

Maddocks.—On July 16, 1955, at 73, Love Lane, Pinner, Middlesex, Stephen Anslow Maddocks, M.R.C.S., L.R.C.P., F.F.R.

O'Sullivan.—On July 1, 1955, at the Atkinson Morley Hospital, Wimbledon, London, S.W., Francis Patrick O'Sullivan, M.B., B.Ch.

Saunderson.—On June 20, 1955, at 104, Charlbert Court, Regent's Park, London, N.W., Alexander Elder Saunderson, M.R.C.S., L.R.C.P., D.P.H.

Sinclair.—On June 22, 1955, at Morven, St. James's Street, Dingwall, Ross-shire, James John Sinclair, M.B., Ch.B.

Vartan.—On June 26, 1955, at Memorial Hospital, Woolwich, London, S.E., Charles Samuel Vartan, M.B., Ch.B., of 10, The Paragon, Blackheath, London, S.E., late of Nottingham, and Sandiacre, Derbyshire, aged 80.

Any Questions?

We publish below a selection of those questions and answers which seem of general interest. It is regretted that it is not possible to supply answers to all questions submitted.

"Cosmetic Surgery"

Q.—*Under what circumstances is cosmetic surgery permissible under the Health Service? What advice should be given to a middle-aged woman of limited means who wants her face lifted?*

A.—Cosmetic surgery is not a special branch of surgery, nor is it so recognized in England. All surgery has its cosmetic aspect or its standard of cosmesis. Any operation badly performed can be cosmetically unpleasant. Therefore it is essential that in all surgical operations a high standard of cosmesis should be maintained. It might be thought that some of the operations performed by plastic surgeons have a cosmetic background entirely, but this is not so; for instance, the operation of face lifting is quite often done to minimize the effects of scars and other traumatic lesions of the face. It is unlikely that an operation which has a frivolous background would be encouraged under the National Health Service, and it is clear that all the circumstances must be taken into account. This is where the good taste and judgment of a surgeon must be exhibited to a high degree. If he feels that the patient's future welfare can be genuinely increased by any form of surgical operation, there is no reason at all why it should not be performed under the Health Service conditions.

The advice, therefore, which should be given to a middle-aged woman of limited means who wants her face lifted would very largely depend upon the reasons which she advances for this work to be done. There being no cosmetic surgeons in England, only an experienced plastic surgeon could give the correct answer to this question, and the general practitioner who has posed it should refer the patient to a competent plastic surgeon, who would investigate fully the why and wherefore before he agreed to recommend the patient for the operation.

First-Aid Dressings in Industry

Q.—*What is the best dressing to use as routine in a factory for the prevention of sepsis in cuts? Dressings have to be changed almost daily as they become soiled with dust, grime, or oils.*

A.—The ideal dressing for a minor wound would be an adhesive dressing, capable of following the contours around a joint during movement. Though impermeable to dirt, bacteria, and water, it should be sufficiently porous to allow perspiration to escape through it, thus preventing maceration of the underlying skin. Such a dressing has been promised for several years, but has not yet actually arrived. Nylon dressings are both waterproof and porous, but are not sufficiently pliable and they do not adhere satisfactorily. They are least useful where they are needed most—on the hands. Research is in progress on other types of porous dressing, but none is yet on the market. Thus all the forms of dressing at present available have certain drawbacks.

Before applying a dressing the wound should be cleaned with 1% cetrimide or a similar preparation. A variety of substances can be used for the dressing next to the wound; probably tulle gras is as good as any. This can now be obtained in tins of small pieces for easy application. The bandage, especially for finger injuries, should be of the new tubular type. Tubular bandages are easy to apply, neat, and economical in use. It is also possible to apply two extra layers of tubular bandage without making the dressing too bulky, and the patient with a dirty job can then remove one layer at lunchtime and a second after going home. One bandage will thus last for 24 hours. Waterproof forms of the tubular bandage are now being produced. The dressing next to the wound should, of course, remain undisturbed during re-dressing, only the covering bandages being replaced.

For small cuts adhesive plaster dressings are useful; these should be waterproof. Maceration of the skin develops under such a dressing, but this disadvantage can be overstressed and probably does not cause any delay in healing. It disappears quickly when the dressing is removed. Occasionally this type of dressing gives rise to sensitization reactions, and it is not really suitable for men working in a hot environment. A liquid plastic is available which can be painted or sprayed on the wound, but it is not at present a satisfactory dressing for use in industry for wounds of the hands, although it can be used for wounds on other parts of the body, especially scalp wounds.

Deferment of Menstruation

Q.—*A patient of mine is going in for a swimming championship on a day on which she expects her period. Is there any preparation she can take to delay the onset of the period for a few days?*

A.—It is often but not always possible to defer a menstrual period by maintaining a high level of oestrogen or progesterone in the blood stream. As a general principle, however, it is unwise to interfere with a physiological process unless there is a very good reason for it. If it is justified in this case, and if time is available, give stilboestrol 1 mg. three times a day by mouth, beginning at the end of the previous menstrual period and continuing until there is no longer any need to delay the onset of the next period. When treatment is suspended, uterine bleeding (which is likely to be anovular) should come on within two to seven days, and it may well be heavier and more prolonged than the usual period. If it is already too late to arrange for treatment covering the whole cycle, then it would probably be best to give daily intramuscular injections of 20 mg. progesterone, as well as stilboestrol 1 mg. thrice daily by mouth, beginning seven days before the period is expected, and continuing up to and including the day of the swimming gala. Again, the deferred period is likely to appear two to seven days after suspending treatment. One practical difficulty is that stilboestrol might cause nausea and vomiting. If it does, ethinyl oestradiol, 0.05 mg. thrice daily, could be tried in its place.

Treatment of Syringomyelia

Q.—*Are there any recent advances in the treatment of syringomyelia? The case I have in mind is a lady of 58 years, in whom the disease is advanced. She has a history of 18 years' standing. Can anything be done to stop further progression? She has been treated by radiotherapy and vitamin injections.*

A.—The treatment most frequently used in syringomyelia is deep *x*-ray therapy. It is difficult to judge the value of this, as deterioration in the untreated disease is often extremely slow. In a number of patients, however, the disease appears to become stationary for long periods after deep *x*-ray therapy, and in the small group of syringomyelia patients who suffer from central pain in the analgesic areas the pain is often relieved by this treatment. Medicinal treatment and vitamin injections do not influence the course of the disease. At intervals since 1907, when it was carried out by Horsley, the operation of posterior myelotomy and evacuation of the cyst has been performed, but the results have not generally been encouraging except in rare cases where the cyst has been large enough to cause a spinal subarachnoid block, when temporary improvement may follow operation. In occasional cases syringomyelia may be associated with or mimicked by basilar impression of the skull, a condition which may be helped by operative treatment. In any suspicious case lateral *x*-ray pictures, including if necessary tomograms, of the upper cervical spine and skull base should be taken with this possibility in mind.

Whipworm Infection among Mental Defectives

Q.—*I am faced with the problem of attempting to prevent the spread of, and if possible eradicate, a whipworm infection in a large, understaffed ward of low- and medium-grade defective children. How should I set about it, and what are the chances of success?*

A.—The first step to take is to treat all the children infected with whipworm. Before attempting to prevent the spread of the infection it would be desirable to ascertain whether in fact infection is at present occurring or whether the children were not already infected when they were admitted. If the possibilities of infection are non-existent, as one would expect them to be in a hospital ward, and with a parasite having a life cycle such as *Trichuris trichiura*, then obviously treatment is all that is necessary. (Direct infection from one child to another, which may occur with eggs of the pinworm, *Enterobius vermicularis*, cannot take place with *T. trichiura*, since the eggs of the latter are non-infective when first passed out and require 3–5 weeks in moist soil for the infective larva to develop inside the shell.) If, however, there is definite proof that children have become infected *after* admission it will be necessary to find out where and how they have picked up the infection. This might happen in two ways: by swallowing infective eggs with food contaminated with human faeces (for example, uncooked vegetables); or from a playing-ground where there is loose soil or clay which has been contaminated with faeces. Control of the first should be easy and does not require any explanation. Control of the second may be very difficult, since the eggs can remain viable in soil for several years. If circumstantial evidence points to a playground as the source of infection, then soil samples should be examined for eggs by some suitable concentration method and the egg-infected sources should be made inaccessible to the children.

Dexamphetamine in Essential Hypertension

Q.—*Is mild essential hypertension a contraindication to the use of dexamphetamine?*

A.—Dexamphetamine is not contraindicated in patients with mild essential hypertension. With therapeutic doses the pressor effect of the drug is negligible and there is no significant change in cardiac output. If dexamphetamine is used to reduce weight in an obese hypertensive patient the blood pressure may fall as the weight falls. Rarely, in the early stages of treatment of such a patient, the blood pressure may rise in the first week or two of treatment, before resuming its original level, and for this reason small doses, such as 5 mg. two or three times a day, should be used when treatment is initiated.

Diet in Toxaemia of Pregnancy

Q.—*Will you please suggest a low-salt diet of maximum variety suitable for patients with early toxaemia of pregnancy?*

A.—The diet for a woman with mild pre-eclampsia should include a daily intake of 80–90 g. protein and have a calorie value of approximately 1,800. To ensure moderate salt restriction it may include any article of food except: salt at table; cheese, ham, salted or smoked fish, salt-water fish, olives, sausages, salted nuts and potato crisps, relishes, pickles, ketchup, baked beans, corned beef, meat extracts, and gravy. More severe and less convenient restriction necessitates the exclusion of salt from cooking and also such foods as canned vegetables, meats and soups, frozen peas and fish fillets, and dried or preserved fruits. Low sodium diets tend to be monotonous because they are tasteless. This difficulty can be overcome to some extent by skilful use of herbs and seasoning materials, the latter including sage, onions, mustard, and vinegar. It should be noted that although a "*salt*-restricted" diet is usually advised for toxaemia of pregnancy, what is really meant is "*sodium*-restricted." It is important, therefore, to see that sodium is not taken in effervescent drinks or in any medicine—in alkaline mixtures for dyspepsia, for example.

Aperients in Acute Illness

Q.—*Are there good reasons for giving aperients to patients with acute illnesses as a routine? Alternatively, is it harmful to allow the patient to go several days without a bowel action? I would welcome a modern comment.*

A.—It is important in acute illnesses to combat dehydration and to maintain a normal fluid and electrolyte content of the body. On this account it is unwise to prescribe aperients until the patient is in satisfactory fluid balance. The constipation is due to a combination of dehydration, toxaemia, and low intake of food, and no harm will ensue if the bowels are not opened for a week or more. The problem is less urgent now than a generation ago, owing to the curtailment of acute infectious illnesses by chemotherapy and antibiotics, and the practice of getting patients up early after operations. It arises most acutely in coronary thrombosis, and haematemesis and melaena. The patients are often elderly, and elderly people sometimes become worried and uncomfortable if their bowels are not opened for several days. However, any form of interference with the bowels in the first few days is likely to provoke shock or recurrence, and a considerable proportion of patients with coronary thrombosis die on the bed-pan. Reassurance about the harmlessness of constipation may help; otherwise the enema and the bedside commode are preferable to aperients. By the end of the first week aperients should be safe, though the patient may require medical help in dislodging the plug of hard faeces from the rectum.

Chiasmal Arachnoiditis

Q.—*A man aged 34 has for over two years been increasingly troubled by paracentral scotomas, initially right-sided, but now bilateral. At exploratory craniotomy a network of fairly dense arachnoidal adhesions was found in the chiasmatic cistern binding down the optic chiasma, and a diagnosis of chiasmal arachnoiditis made. What is the aetiology, treatment, and prognosis of this condition?*

A.—Chiasmal arachnoiditis is an ill-defined condition from aetiological, pathological, and clinical viewpoints, and its existence as a disease entity is questioned by some. It must be differentiated from post-meningitic scarring round the optic nerves, which may also lead to severe visual impairment. Nothing is known about its aetiology. Thickening of the arachnoid related to the optic nerves and chiasma, varying in degree and sometimes associated with cyst formation, is the essential pathological abnormality. Clinically, visual failure, unilateral or bilateral, varying in its rate of progression and showing remissions, is the essential feature. The condition is said to progress to blindness with remissions. Diagnosis depends upon the exclusion of other possibilities, and the only treatment is surgical. It is probable that some cases regarded as being examples of chiasmal arachnoiditis are in fact cases of retrobulbar neuritis and disseminated sclerosis—though the latter diagnosis cannot be made without evidence of lesions elsewhere. The fact that the improvement following surgery may not appear for several months raises the possibility that surgery is unrelated to the improvement.

Vitreous Opacities

Q.—*A patient and myself both suffer severely from a thick curtain of heavy vitreous opacities. Is there any recent new treatment which might be of use in this condition?*

A.—There is no certain method of eliminating vitreous opacities. For many years potassium iodide used to be prescribed with this object, but it was almost certainly ineffective. If the opacities have arisen from an attack of choroido-retinitis, they tend to absorb during convalescence: and the same spontaneous improvement will often be noted

after a large retinal haemorrhage, provided that the eye is in other ways healthy. Among elderly patients a few mobile anterior vitreous opacities are almost the rule, and are sometimes obtrusive, but most people can learn to ignore them when they are assured that the floating dots do not mean cataract. Myopes are especially liable to vitreous opacities, which cannot be dispersed by any medical or surgical means.

Use of Methonium Compounds in Emphysema

Q.—*I understand that hexamethonium bromide is now used in the treatment of emphysema. I should be most grateful for some details.*

A.—The action of hexamethonium bromide in emphysema is very complex. Its use was first suggested in those cases in which pulmonary hypertension had developed, with the object of reducing this and the consequent strain on the right ventricle. As a ganglion-blocking agent, it probably also has some effect on bronchial muscle tone and bronchial secretion. Since the pulmonary artery pressure is usually raised only in the acute exacerbations of bronchitis and bronchopneumonia which punctuate the course of emphysema, and it is rarely raised in ambulant patients, the action of hexamethonium bromide on the pulmonary circulation is unlikely to be of any value in the long-term management of emphysema. A controlled study has indicated that more patients with severe emphysema claimed relief of dyspnoea when receiving hexamethonium than when receiving a placebo, but on the other hand many of them suffered unpleasant side-effects, and it is doubtful whether the degree of symptomatic relief is more than would be obtained by the use of the usual antispasmodic drugs. On the whole, the use of hexamethonium bromide in emphysema must be regarded as under investigation, and certainly cannot be regarded as an established procedure.

Aching Testicles after Mumps Orchitis

Q.—*Two of my patients, men in their thirties, suffered from unilateral orchitis following mumps about a year ago. There is atrophy of one testis in each case. Both complain of periodical aching and discomfort in the external genitalia, especially when cold and tired. Examination is negative. Is this a common condition, and how long is it likely to last?*

A.—The pain of mumps orchitis usually goes as the swelling subsides and atrophy ensues. It is not common for it to persist for a year, although another patient recently seen still complains of an occasional ache in the testis many years after mumps. It is likely that these symptoms will disappear, but their duration cannot be foretold. Reassurance may well help.

Epidemiology of Herpes Simplex

Q.—*What is the relationship between the viruses of herpes simplex and herpes zoster? How is infection with the virus of herpes simplex spread? Is there any cross-immunity between the two viruses?*

A.—The viruses of herpes simplex and herpes zoster both produce vesicular lesions which, to the naked eye and on microscopical examination of sections, have the same structure and appearance. However, the lesions due to herpes simplex virus usually appear at mucocutaneous junctions, especially about the lips, the nose, and occasionally the genitals, whereas the lesions of herpes zoster usually occur on an area of skin or mucous membrane corresponding to the distribution of sensory nerves derived from the posterior spinal root ganglia or corresponding ganglia of cranial nerves. The viruses are of similar size as determined by electron microscope and produce similar intranuclear inclusions in infected cells. The viruses are serologically and immunologically quite unrelated. An attack of zoster confers no immunity to the virus of herpes simplex.

Infection with herpex simplex virus is usually acquired during the first five years of life through direct or indirect contact with infected parents or older siblings. After the primary infection the child tends to harbour the virus for many years, perhaps for life, and may suffer from recurrent clinical attacks of "cold sores"—the local manifestation of herpetic infection. Such a person serves as a source of spread by direct contact or by infected saliva.

Snoring

Q.—*A healthy man of 45, with no abnormality of the air passages, snores excessively. Is there any effective treatment for this condition? Would a dental plate extending over the soft palate be any help?*

A.—Snoring in adults occurs usually when the lower jaw drops, the mouth opens widely, and the tongue falls back. As this is much more likely to happen when lying on the back than on the side, the classical remedy of sewing some hard object to the back of the pyjama jacket is often effective. There would be no value in the suggested dental plate extending over the soft palate, as this could not be tolerated by the wearer. A bandage to support the chin and keep the mouth closed would be much more effective.

Swimming-baths in Convalescence from Poliomyelitis

Q.—*I should be very grateful for some advice on the use of swimming-baths to help patients with paralysis due to poliomyelitis.*

A.—Treatment in a warm swimming-bath is of value in certain patients with residual paralysis following anterior poliomyelitis, the warmth increasing the circulation and exercises under water helping to counteract the effects of gravity on the weak muscles. Such treatment is of most value for muscles which have begun to contract voluntarily but cannot yet contract against resistance. In addition the warmth and buoyancy are often valuable in obtaining freer movements in muscles which have improved beyond this stage, and the attraction of exercises in a swimming-pool as opposed to ordinary active exercises may be encouraging to patients who need prolonged physiotherapy.

NOTES AND COMMENTS

Sulphone Poisoning.—Dr. M. H. A. JAMISON (Northern Rhodesia) writes: With reference to the reply on "Sulphone Poisoning" ("Any Questions?" April 30, p. 216) I would be glad of other practitioners' views on the use of B.A.L. (dimercaprol) as an antidote for sulphone poisoning. Over the past three years I have used it in five cases of severe sulphone toxaemia. The first patient had a severe hepatitis with deep jaundice and was obviously dying, to whom I gave B.A.L. as a last resort. The response was dramatic. My other cases were not so severe nor was the action so marked, as I had administered B.A.L. at an earlier stage.

Correction.—Dr. K. DOUGLAS SALZMANN writes: In my article on "Obstetrics in General Practice" (July 2, p. 18) it was erroneously stated that, in four general-practitioner maternity units in the Oxford area, Stallworthy reported among 1,097 cases an uncorrected foetal mortality rate of 22 stillbirths per 1,000. This figure represented stillbirths and neonatal deaths combined. The comparable figure for Dellwood (1950 and 1951) was not 12 stillbirths per 1,000, but 21 stillbirths and neonatal deaths per 1,000.

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